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Editorial

Carola Grindea

ISSTIP continues to play an increasing role in the musical and medical professions thanks to its valuable work with musicians suffering from physical problems or injuries and from psychological dysfunctions - be it through the regular sessions at the PERFORMING ARTS CLINIC at the London College of Music or through workshops, courses and especially by organising International Conferences on 'Health and the Performing Arts'.

Inspired by the impact created by the first FORUM on 'Musicians Problems' in October 1996 at Steinway & Sons, in London, ISSTIP arranged an International Conference in October 1997 at the Royal Festival Hall, South Bank, which proved once again the great need for broader dialogue and cooperation between the musical and the medical professions.

Medical specialists came from as far as Russia: *Dr Elena Pronkova*, neurologist, attached to the Moscow Conservatory of Music and to several Music Schools in Moscow; from USA, *Dr Frank Wilson*, neurologist, Medical Director of the Peter F. Ostwald 'Health Programme for Performers' at California University, San Francisco; from France, *Professor Raoul Tubiana*, Director 'Institut de la Main' in Paris; from Britain, *Dr C. B. Wynn Parry*, neurologist and rheumatologist, Consultant/Adviser at ISSTIP and BPAMT 'Performing Arts Clinics' and *Mr Tom Harris*, ENT Surgeon, Director 'Voice Clinic' Queen Mary Hospital, Sidcup.

They presented their own findings on the causes and therapies of the various types of problems and injuries, and, as specialists in the field of 'Focal Dystonia' in instrumentalists, this serious condition was thoroughly debated.

They took part in discussions on many aspects and, also on means of prevention of these conditions, with the musicians and the other speakers: Professors *Pamela Bowden* (Co-director ISSTIP Performing Arts Clinic at LCM, where she is Head of Singing), *Carlos Bonell* (Guitar Prof RCM and LCM), *Carola Grindea* (Co-director PAC

at LCM, former Piano Professor GSM), *Emanuel Hurwitz* (past President ISM, former violin Prof RAM), *Renna Kellaway* (Head of Piano, RNCM), *Galina Minsker* (Piano Prof St Petersburg Academy of Culture), *Yfrah Neaman* (Violin Prof GSM, Head of Post Graduate Studies), *Penelope Roskell* (Piano Prof LCM), *Dr Edward Ho* (Head of Music Kingston University), *Alberto Portugheis* (Vice Chairman ISSTIP), *Tatiana Melnikova* (Physiotherapist, Dr Pronkova's collaborator in Moscow), *Karen Sell* (Singers' consultant), *Richard Crozier* (Director ABRSM Training Course for Teachers), *Suzanna Widmer MA*. (researcher).

While heated discussions went on in the Chelmsfield Room, next door, in the Board Room, an enthusiastic audience took part in the workshops and demonstrations on therapeutic sessions including "Breathing Techniques" with *Jeannette Nelson*, (Speech and Voice Prof GSM and the Globe and National Theatre consultant); 'Mental Training System', *Tatjana Orloff-Tchekorsky* (Director Bonn Institute); Yoga Exercises for Musicians - *Penelope Roskell*; Chi-Kung demonstrations - *Chan Zhang*, USA; Preparing for Auditions with *Nina Finburgh*, (Actors Centre); *Gale Simmonds* (Students Counsellor) talked about her approach to the subject; *Gary Derrick*, Osteopath, demonstrated his exercises to relieve pain and *Carola Grindea* conducted a 'Performing Arts Clinic' with *Tatiana Melnikova*, and *Gary Derrick*.

One of the guinea-pigs was a 15-year old clarinetist who was told by the hand surgeon to think of another profession! She left the clinic with a correct posture, without pains in her hands and wrists and also knowing how to relax her body and arms, how to relate to the instrument (ergonomy) and, particularly, how to practise. Other musicians were seen by the specialists present, including a 'dystonia' case which was examined by the four medical experts in the field. *They all recommended a re-assessment of her technique.*

The conference provided a splendid platform for the first productive dialogue

between musicians, therapists and the medical specialists in the **Round Table** debates, especially in the session with professors from music colleges, music faculties and directors of courses responsible for the training of voice and instrumental teachers, chaired by *Thea Carr*. They were all in full agreement as to their role in the training of instrumental teachers and performers. These should be better prepared to understand how to prevent these injuries both in their own practising and performing and in their teaching of young pupils. This is of great importance as these injuries set in early, in the beginners stages of learning to play an instrument.

Professor Renna Kellaway summed up the importance of this conference and its implications stating that "it would be beneficial, surely, if these impressive lectures could be presented at all main Conservatoires in the UK".

This is also ISSTIP's goal. Above all what is needed is a well-coordinated campaign by all the institutions concerned with the well-being of musicians in collaboration with the media and the national press. By a happy coincidence, BBC Radio 3 organised an 'Awareness Week' at the same time as the ISSTIP Conference, which culminated in the setting-up of BBC Radio 3 Helpline (0800 033033). Alas, this has now been abolished.

Two videos of the Conference proceedings (Chelmsford Room) available at £15 each from ISSTIP.

In this issue we include some of the important communications presented at the conference. Space does not allow us to publish the entire proceedings but we hope to do so in a future issue.

We would like to remind our readers that ISSTIP and its valuable activities feature now on the INTERNET in the section 'MUSICIANS HEALTH' at:

<http://www.musiciansgallery.com/health>

ISSTIP thanks *Prof John Georgiades* and *Andreja Maletkovic* for introducing ISSTIP on the INTERNET.

General Advice to Musicians

Christopher B. Wynn Parry, M.B.E., M.A., D.M., F.R.C.P., F.R.C.S.

Neurolog/rheumatologist, Consultant Adviser at ISSTIP and BPAMT Performing Arts Clinics,
Co-author (with Ian Winspur, F.R.C.S., F.A.C.S.) of the highly acclaimed book 'The Musician's Hand' (Martin Dunitz).

Responsibilities of Performing Musicians

1. Importance of general fitness
2. Importance of good posture
3. Good, well balanced diet
4. Need to work on RELAXATION
5. Importance of 'warming-up' and 'cooling down'
6. Sensible practice technique: not more than 20-30 minutes at a time.
STOP and stretch for five minutes or have a drink.
7. Need to have some 'body control' technique so that musicians can control the body in times of stress and not let it control them!
8. Need for recreation/holidays
9. Need to develop a broad culture

Responsibilities of Teachers

1. Correct choice of instrument for musician's body build and temperament
2. Correct technique from early stages
3. Inculcate sensible practice and study technique
4. Early referral to Doctor/Therapist in case of trouble

Playing should never be painful if technique is sound, body fit and mind and spirit calm!

The 'General Advice to Musicians' is an excerpt from the session presented at ISSTIP Conference (October 1997) at RFH, Southbank, London.

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Glenn Gould's Hand

Frank R. Wilson, M.D. *Consultant Neurologist, Medical Director*

'Peter F. Ostwald Health Program for Performing Artists', University of California, San Francisco

GLENN GOULD was one of the most exceptionally gifted musicians of our century; indeed, his recordings still outsell those of any other pianist. His initial recording of Bach's Goldberg Variations at the age of 24 resulted in immediate performances with the New York, Moscow, and Berlin Philharmonic orchestras, and for the next seven years he enjoyed international celebrity as a concert artist. In 1964 he abruptly retired from the stage, and from that year until his death in 1982 he played only in the recording and broadcast studio. It is not widely known that Gould was forced to stop playing entirely in the summer of 1977, and that he spent more than a year trying to overcome the hand problem which had disrupted his playing. After reviewing portions of the film record, Gould's diary and some of his interviews, I am, if not convinced, at least deeply suspicious that a complex set of biomechanical factors exerted a major, hidden constraint on Gould's work throughout his career, and that his hand problem was actually a *focal dystonia* (the *cramp*).

Robert Schumann's hand problems were common knowledge. By comparison, Gould seems to have had a very private and very quiet struggle with his hands. Precisely what was wrong, how long trouble had been brewing, and why the situation exploded when it did, have never been explained. But his detailed diary leaves no doubt that longstanding minor problems accelerated into a full-blown "collapse" in the summer of 1977 and became his dominant musical concern for over a year. The diary concludes with a frustrated declaration of failure: he did not believe he had solved the problem, even though the situation was not as bad as it had been at its worst.

Since he recorded the *Goldberg Variations* for a second time three years after the diary ends we are left in a quandary: did he ultimately solve the problem? Did it eventually subside on its own? Or did he simply discover a way to play around it? Whichever explanation is true, this is certain: Gould's year-long inability to play was not simply a footnote—or an embarrassing blemish—to his career. A major crisis struck during

the most productive period of his mature working years, and his crisis bears a striking resemblance to those which have struck other ranking artists in early- and mid-career.

Everyone suspects that Gould's eventual retreat from concertizing was somehow tied up with his body, because he was such a physical spectacle on stage. He played with uncommon precision, even for a virtuoso, but he did so despite an appalling, in fact shocking posture. When he plays the *Casella*, which he mentions at the beginning of the diary, he looks almost like a praying mantis. Only Cocteau, languid and smoking a cigarette, looked more peculiar seated at the piano. Worse yet, he was unable to suppress his own vocalizing as he played. Gould knew what people thought of these distractions, and although he apologised for the singing, he was adamant that the way he sat was nobody's business but his: indeed, he argued that one ought to sit as he did when playing the pre-romantic literature.

As Gould told Jonathan Cott:

I discovered early on that there are certain keys to the kingdom in terms of manipulating the instrument which are not those of the Prussian school, obviously. The special circumstances in terms of repertoire have to do with situations that do not demand a widening of the hands—say Bach or Mozart or pre-Bach. But you cannot, you simply cannot play Scriabin in that position, for the simple reason that the leverage required to support a widening of the hands is such that you have to be further from the keyboard. But you can play Bach that way, and should, because by doing so you refine the sound, you minimise the pianistic aspects of it, and you increase your control.

When I first read this paragraph over five years ago, I missed its covert message. I hope to make clear to you what that message is, and its possible relevance to Gould's work, and to his difficulties, at the piano.

Gould sought help from doctors throughout his career; indeed, he is conventionally depicted as a sort of black-belt hypochondriac. Since he was

isolated and eccentric in both his habits and his outlook, and arcane in his perceptions and descriptions of himself, it is not clear how he might have overcome that reputation even if he had wanted to. He suffered openly from stage fright, and his career became a seemingly endless march of musculoskeletal complaints. Friedrich's biography is extremely cordial to the doctors who cared for him, and who humored him as best they knew how. What more can you say?

Well, there is more to say, and it is this: Gould may or may not have been a confirmed hypochondriac, but he was no fool. He was as deeply in tune with his own body as he was with the music of Bach, and when the hand problem forced him to stop work in 1977, with his career at stake and apparently convinced no doctor could help him, he turned his studio into an experimental laboratory with his own body as the object of inquiry. For the next year he used his eyes, ears, his exquisitely tuned kinesthetic sense, and his imagination, to dismantle and scrutinise virtually everything in his own posture and movements which might bear in any way on his playing. He kept a diary of his various experiments, observations and conclusions during that year. The diary makes it impossible to view the films without wondering whether some of the most secure popular and scholarly judgments about his playing may have to be scrapped.

In order to explain what appears to have happened, I need to take you on a small excursion through the investigative side of performing arts medicine, and to share just a bit of my own research with you. The overview is as follows: Gould's diary is actually a shocker. It leaves as compelling a description as one could hope to have of the same hand malfunction which stopped the performance careers of both Gary Graffman and Leon Fleischer—*focal dystonia*. Schumann may well have had it, too, and although this is a topic for another day, Chopin may have spent most of his career artfully—very artfully, one would have to say—avoiding membership to this dreaded club. We cannot prove the case with Gould, because we would need to have him

here to be certain. But the available record unequivocally supports that conclusion.

Musician's *cramp* has a particularly fiendish way of turning diligence to disadvantage, because it usually begins insidiously, with small oddities or discrepancies in performance, not unlike countless others which can normally be corrected with extra practice. In this situation, unfortunately, an increase in practice just makes matters worse, and by the time the musician realises that something is seriously wrong, the trap has been sprung. A highly skilled hand has been innocently and ardently rehearsed into wreckage. The process can be slow, evolving over years, or very rapid—occurring literally overnight—and the degree to which the skill is affected can be minor or totally disabling. For a musician, of course, even the slightest interference with control of the hands can be musically fatal.

No one knows what causes *occupational cramp*, but until the early 1980's it was widely thought to be a psychological disorder. People who develop it tend to be perfectionists in their habits and are often considered by their doctors to be hysterical. Then, in 1982, Professor Marsden's group in London presented physiologic evidence that occupational cramp was a variant of generalised dystonia, which is to say, the expression of a brain disease. Unfortunately, shifting the oversight of this problem from psychiatry to neurology has made very little difference to the patients: with or without treatment, occupational cramp retains its ugly reputation. It is still almost impossible to fix.

During my research year at the University of Düsseldorf an effort was made to improve our understanding of the neurologic and behavioral correlates of focal dystonia in musicians. Although the neurologic evaluations added nothing to what was already known, a number of our patients were seen in Professor Wagner's laboratory in Hannover, and he was able to demonstrate a consistent and striking biomechanical tendency in the hands of nearly two thirds of the musicians with focal dystonia. In these patients, even when the dystonia affected only one hand (which is usually the case) the fingers of both hands were severely restricted in passive abduction movements—when the hand is held flat, the fingers do not easily move apart.

At first we thought we might be looking at an effect of dystonia rather than a cause: obviously, if the muscles of the hand are tight, or cramp when movement is

attempted, you would expect the fingers not to move as easily as they should. But one musician in the group was as hypermobile as the others were tight, and virtually all of the musicians with low span width scores told us that they had always had to work to overcome inflexibility in their hands. One pianist, a conservatory student, told us he couldn't understand why it was that his head was always so far ahead of what his hands could do; indeed, it was a longstanding source of irritation to him that other students could play certain kinds of music better than he could. He had no trouble with Bach or Mozart, for example, but simply could not manage Schumann or Rachmaninoff.

These musicians were both talented and highly motivated, and for all of them the problem had surfaced when they were under unusual pressure: there was an audition, an important tour, a recording, or a solo program being prepared to satisfy the requirements for a performance degree. In other words, the symptoms had developed when the stakes were high and time was short. Some musicians also recalled their symptoms beginning just after changing an instrument, when they were learning a new and technically difficult piece of music, or after a new teacher suggested or demanded a change in playing technique. Rarely, an apparently trivial injury seemed to act as a trigger. Based on all these stories, we began to appreciate how often the onset of the problem coincided with the imposition of a functional demand which the hand might not be able to meet at performance tempo.

We also began to suspect that the interaction of music and technique could unmask pre existing biomechanical constraints—a particular structural or functional trait of the hand or arm unique to an individual—which by pure chance turned out to be unfavorable to the achievement of specific movement sequences, which is to say, playing certain combinations of notes on a particular instrument. Unaware of any anatomic basis for a technical hitch in his or her playing, the musician would intensify the practising, the difficulties would increase and the stage would be set for disaster. A hand whose problems had begun innocently with an occasional missed note, or a slight unevenness in rhythm or dynamics, would now go into spasms as soon as it made contact with the instrument.

With this background, let us now turn to the diary Gould began in the summer of 1977.

During the 2nd TV taping (first week of June) lack of coordination was immediately apparent—Opening theme of Casella was unbalanced and notes appeared to stick and scale-like passages were uneven and uncontrolled. At this period problem appeared primarily in dynamically restrained passages. An unpleasant experience, and seemingly immune to solution by *ad hoc* pressures. During the next two weeks problems increased. It was no longer possible to play even Bach Chorale securely—parts were unbalanced, progression from note to note insecure.

Early in this diary, Gould introduces a term which he does not define, and whose precise meaning I do not believe can be extracted from the text. The word is "indent," and at times it is used in a way which suggests that he means simply the joint crease on the flexor surface of the finger, and at other times suggests he is referring to a finger joint that is sharply flexed (which would have the effect of making the crease visually more prominent). He refers many times in the diary to the "indents" and indicates that at times they are involuntary, but that controlling them has become an established part of his strategy to solve the problem. The first entry continues:

All attempts to apply thumb indents as stabilisers failed; among other symptoms was inability to articulate chords without arpeggiation and to control even those chords at any but the most minimal dynamic levels.

(Incidentally, I have been told that Gould was criticised throughout his career for his tendency to arpeggiate chords).

Finger indents had appeared, in the exaggerated way described, in 2nd week of June; they appeared to be an uninvited semi-solution to the dilemma, and materialized (uninvited) in the studio. This suggests that they were reacting to over tense area elsewhere (possibly top of hand knuckles).

On September 29, he reviews what has happened:

No playing during past 3-4 days. Upon approaching piano, some degree of control was evident, but following problems were in evidence as well: (1) trill control hazardous especially in stretched hand position (D major Partita); (2) frequent "sticking note" syndrome; (3) as result of above, dynamic unevenness much in evidence; (4) still too much

"downward address" sensation; (5) collapsed spine and shoulder correlation were used, but from time to time reversion to curved knuckle was tried; it temporarily stabilized dynamic control, though at a very restricted range. (6) wrist flexibility as indent monitor was no problem but it did not alleviate problems as described above. Experiments continue.

Through the diary we learn that many new shoulder positions were attempted. The effect of facial grimacing was investigated. The curvature of the back was modified. Mental imagery was used; sensations in the wrist and across the knuckles were monitored closely. He used favourite test passages to assess his progress. There were apparent breakthroughs and revelations, but again and again he would discover that he had not solved the problem. Now it is 1978:

February 6. 3'40". Disaster. The cycle is renewed. I do not understand why the system which worked superbly and continuously in May '67 should be but a one-day wonder now.

March 5. The superb fluency of trills (every note with its own specific, minute, adjustment) was quite lost.

March 17. There was some concern about extreme lightness being suitable for other (than Bach) repertoire and about necessity to raise fingers well off keys as response to elevation controls. Elevation produced bumpy quality in articulation.

April 8. The pendulum continues to swing. During the past 3 weeks I have tried fingers-only control; for close to a week this seemed like the long-lost security blanket; it also seemed like a return to age 15 fingers-only style. Beginning on the second or third day, however, there were wrist tightness problems, and, gradually, the separation of one note from the next deteriorated into bumpy grouping and a general lack of fluidity. There was also a general lack of volume control—the fingers permitted only a very restricted surface contact. Finger position was sharply etched (and he draws a right angle figure here).

April 26. A substantial list of pluses, in regard to the right hand, no debits. The left, in contrapuntal repertoire did not pose a great problem; the Toccatas, for example, were consistently fine. One wondered, however, what would happen if left hand was required to introduce thematic material.

June 16. Let us hope there will be no more entries: I do believe the solution has been found. It involves letting the hand-knuckle bridge rise as a result of the finger indent, an absorptive response to finger patterns. The rise treats the hand as a platform from which fingers reach out and explore the keys below. This makes maximum passage available to the thumb, which then proceeds to be indented but not pressured. Indeed, the secret is that because of the platform none of the fingers are unreasonably pressured, though all respond with indents.

June 23. Everything in the last entry is far from the last word. Last night, every conceivable variant was employed, none with success. For the last several days, right wrist had been unbearably sore after any 10-15 minute practice period. The discomfort seemed a response to the hand-knuckle bridge rise.

July 1. I went to apartment at 11:30 pm. The results were horrendous. *G major Toccata and Fugue* which had become a show piece was bumpy, unrhythmic and ditto everything else that was played.

July 12. As usual. 2 hr session provided unstable results.

I am describing here a brief video, showing mainly overhead views. At the beginning I have slowed things down considerably to observe the way he holds and uses his hands, and in particular the movements in the center of his hands. What I see in this sequence, in both hands, is exceptional agility of the fingers in the vertical direction, and an extreme inclination to keep the index, middle and ring fingers close together. I have counted only three occasions during which the middle and ring fingers separated as far as the distance from D# to the adjacent F#, and in one of those cases the ring finger was holding down the F# (and of course being held by the key) while the hand and middle finger moved away to the left. This is a hand, in other words, for which the act of "widening"—to use Gould's term in the Jonathan Cott interview—would require leverage. Only rarely, in my experience, do pianists comment on the physical effort required to move their fingers apart.

The video concludes with brief excerpts of his final taping of the Goldberg Variations. Here one can see a remarkable change in the way he uses his fingers, and the change one sees, I believe, makes clear what he means by

the term "indents." If one watches the fifth and fourth fingers closely, one sees that both now have a tendency to curl tightly into the palm. This is not seen in his earlier playing; it appears to be a mild form of the disturbance we have seen in both Graffman and Fleisher, and which occurs as a common form of *cramp* in other pianists. His hand may have improved compared to what Gould described in the 1977 and 1978 diary entries. But even in this condition the movement is distinctly abnormal, for any pianist, but especially for him.

Conclusion

I do not know if he had *musician's cramp*, but I believe he did, that he developed it in 1977, and that he managed to fight it to a draw. The diary provides abundant and specific documentation of the kind of altered hand control which invariably occurs in *focal dystonia*. Reading the diary led me to guess that films of his playing might demonstrate a pattern of restricted finger *abduction*, and that is exactly what we see from the time of his earliest recordings to the final recording of the Goldberg Variations. Gould had a large hand whose 3rd and 4th fingers rarely separated when he was playing, even during octave stretches. It is not, I would emphasise, that they could not do this, but rather that the movement is rarely seen. This is precisely the same tendency we have learned to look for in all musicians with focal dystonia; it is observed before the dystonia develops, and it is a consequence of innate hand structure.

If Gould did have a focal dystonia, he is virtually unique in having left us clear and extensive documentation of a thoughtful, meticulous and at least partially successful effort at remediation. He would also be one of very few pianists to find a successful venue in which to perform despite the limitations imposed by this disorder.

A second biomechanical issue about Gould exists, and it could well have an important bearing on the dystonia question. He very likely also had a marked limitation in what is called *pronation range*—the ability to bring the hand flat onto the keyboard. Pianists with low pronation range must either force the hand into a flat position, or they must move their elbows away from the side of the body. When they do this, they also tend to turn their forearms in and bend their hands out. Sitting low at the piano while holding the arms in that way would

help overcome an extreme limitation of pronation range. This particular configuration of the arm—a Gould trademark, as you know—generates a whole new set of complications in control of the hand at the piano.

There is here a tantalizing new issue. No one ever suggested during his life that Gould had a biomechanical predisposition to sit at the piano in a certain way, or to use his hands in a certain way. But there it is: he could easily have sat the way he did, chosen the music he did, and experienced the frustrations he did, because of the way he was built!

Gould's physical "eccentricities" and the hand problem which surfaced in 1977 could well be the only visible clue that his arms and hands were not remotely capable of supporting in performance what his mind was capable of doing. The recording studio and a carefully selected repertoire gave him a place both to grow and to enrich the understanding of all his listeners, and in it he produced a timeless and utterly distinctive synthesis of interpretive thought and musical execution.

The question which haunts me, and which should haunt everyone who teaches young musicians is this: what

might Glenn Gould have done had anyone understood why his hands responded as they did? Could we possibly condone the distress and career disruptions of the Graffman's and Fleisher's and Gould's if we thought we could predict and prevent their physical problems? Focal dystonia can be predicted, and there is at least some evidence it can also be prevented. Technical training can be adapted to the hand so that the musician pays a minimum penalty for the limitation, and apparently the same strategy can reverse symptoms if they are detected at the beginning.

There is, of course, a more general appeal implied here. A biomechanically informed approach to technical training really makes sense for all musicians; technical training should respect the uniqueness of the individual hand if its full potential is to be realised and injury is to be avoided. I realise that the inside of the arm and hand are very complex structures; so is the inside of the piano. But you can get a new piano.

Presentation given at ISSTIP Conference, 18th October 1997, at South Bank, London, with video illustrations.

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by Nicola Culf MMus, Dip(RCM), ARCM

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Functional Anatomy and Physiology

Some Basic Concepts on the Physiology of Movements

Professor Raoul Tubiana

Director 'Institut de la Main', Hand, Elbow and Shoulder Surgery, Clinique Jouvenet, Paris

Instrumentalists, including windplayers who use their hands and mouth continuously and most of the time unconsciously, adopt positions and develop compensating movements to facilitate their playing without considering the physiological balance of the muscles or the biomechanics of the joints. Therefore it would seem obvious that instrumentalists and especially instrumental teachers should have a basic knowledge of anatomy and physiology, subjects poorly covered in conservatories. They should learn the normal mechanism of movements in order to become aware of *non-physiological movements*. Musicians are commonly being compared with athletes as both are trained to perform rapid, complex, co-ordinated movements often to the limits of their abilities. However, while athletes have learned to build up their entire musculature symmetrically in association with the practice of more specific physical movements, instrumentalists have developed the same qualities of strength and agility in certain muscle groups only. Since a musician's athletic musculature is localised to specific segments: the hands and arms, the rest of the body remains often untrained. It is therefore not surprising that this imbalance is a potential source of difficulties. Whilst athletes are constantly surrounded by trainers, soothed by masseurs and physiotherapists and supervised by specialists in sport medicine, musicians, who after all are manual labourers who depend on perfect fitness, are left to their own devices.

It is not the intent of this paper to describe in detail the functional anatomy of the entire body but a few essential points must be underlined. Even though the hand or the mouth (depending on the instrument) is the major tool of the musician, *the whole body is affected by the way the instrument is played*: the lower limbs and pelvis provide truncanl support, the spine and thoracic cage are the stabilising bone units for the upper limbs movements and the cervical spine allows head mobility. All segments of the skeleton are interdependent and a physical examination should never be limited to only one part of the body. All

movements away from a resting position provoke reactions at other levels. For example, an exaggeration of the thoracic kyphosis causes a forward projection of the head and excessive compensatory lordosis of the cervical spine, all of which are accompanied by various muscular and ligamentous tensions. The importance of 'good posture' cannot be stressed enough during music practice. *But what is meant by 'good posture'?* It is a condition when the whole body is in physiological equilibrium and when the use of muscle groups other than those required for a given movement should be avoided. Good posture allows the repetitive specific movements with a minimum of stress on the body. Of course, whilst playing, it is impossible to avoid momentary lapses from an ideal posture, but since chronic poor posture is difficult to correct one must not permit long-term imbalances to become established. Obviously, immobility and rigidity at the expense of flexibility and rhythm should be avoided but movements must be limited so that they do not allow harmful counter-movements.

It is also important to realise that *no muscle functions in isolation*. Every movement requires the contraction of several muscles: 'agonists' which initiate the movement and 'antagonists' which act as a breaking mechanism. The amplitude and force of the movement is determined by the modulation of their action and it is these movements rather than individual muscles that are represented in the cerebral cortex (Wood Jones 1942). Look at the *Homunculus* with its enormous mouth and hand (Fig 1). This diagram which shows the cortical representations of the various muscle groups was drawn by Penfield (1937) following experiments with motor cortex stimulation. However, the cortical representation is not proportional to the muscle mass active during a movement but reflects the precision and dexterity that movement requires. The digits are all represented individually. The hand as an organ of action has numerous interactions with the mouth. Placed at the extremity of the upper limb, the hand is functionally organised to take the food by means of pronation of the forearm and

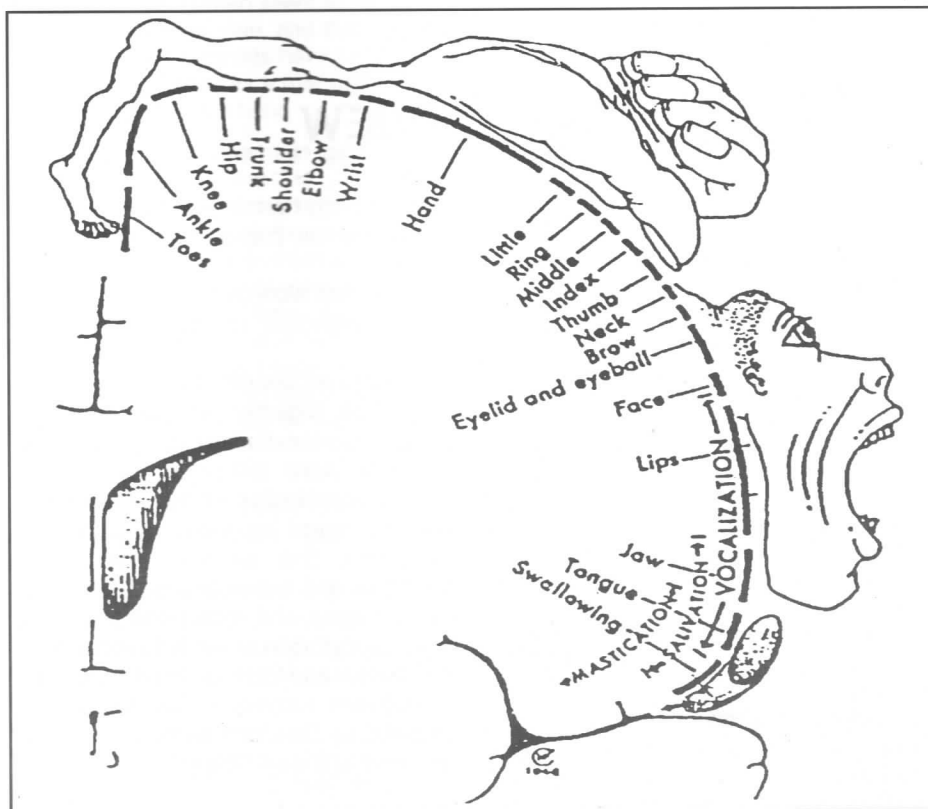


Fig. 1 Map of the Cortical Territory (Penfield and Rasmussen 1950)

to the mouth by means of flexion of the elbow and supination of the forearm. After liberating themselves partially from their close nutritional collaboration, the mouth and the hand have developed more subtle connections. Gestures with the hand have helped shape language and music (the language of sounds) by contributing rhythm and by mimicking the oratorical action. Thus, the hand, along with sounds and speech, mirrors our emotions.

However, it must never be forgotten that the hand and mouth despite their enormous complexity are only agents of the nervous system. The entire nervous system is involved when playing an instrument. The frontal cortex is the conductor and its orders are transmitted to the motor cortex: they are subsequently co-ordinated by subcortical centres where posture is adjusted and finally reach the medulla from which rise the peripheral motor neurones. All these elementary actions are corrected by a flow of visual, auditory and sensory information for the adjustment of the muscle tone. The sensory pathways are linked to regulation of motor function at all levels of the nervous system. The hand in particular is equipped with innumerable sensory receptors that are

spread in the skin, tendons and joints. Receptors gather information from the outside, exoreceptors, and from the body, proprioceptors - describing position and displacement of each segment of the hand in space. Various types of receptors are designed to collect information or stimuli with particular characteristics: mechanoreceptors, thermoreceptors, nociceptors etc. which are then transformed into electrical impulses and transmitted to the central nervous system. Thus, each stimulus is broken down into basic impulses from various sensory nerves and is reinterpreted in the brain.

Once the phase of sensorimotor apprenticeship is over, the complex activities are governed by a basic principle of economy. New connections between the performed central nervous pathways are established allowing an automatization of responses. Next to conscious control of complex activities, a control system described as 'computer control' (Moberg 1976) has evolved that does not involve the cerebral cortex. This automatization of stereotyped movements is necessary to free our attention for activities requiring complete concentration. Such automatization is indispensable in a musical performance

as this is a highly skilled neuromuscular activity which requires great accuracy and velocity. Instrumentalists can play 25-30 notes per second and fingering must be extremely precise as slight inaccuracies lead to wrong notes. Such dexterity and precision can only be acquired through long apprenticeship often begun at an early age. It involves infinite daily repetition of movements to allow the development of an automatic control. However, once the mind is free of technical considerations, the musician is able to concentrate on his or her performance, on the timbre, tempo, rhythm and emotion, all those personal aspects which define the artist.

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VIDEO REVIEW

FREEING THE CAGED BIRD Video Cassette on Developing Well- Coordinated Injury-Preventive Piano Technique

by Barbara Lister-Sink
'Wingsound' PO Box 10912,
Winston-Salem, Carolina.

UK Distributors: Stat Books,
20 London House, London SW10 9EL £34.00

Barbara Lister-Sink, a well-known pianist and professor, formerly at Eastman School of music and at present Artist-in-Residence at Salem College, had been afflicted by physical problems and injuries for several years before discovering a healthy approach to piano-playing which she clearly expounds on this Video Cassette.

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- Lister-Sink together with her students present demonstrations on how a free, effortless piano technique, based on a natural coordination of the whole body, can be learnt by every student and performer. She analyses the neuromuscular and bio-mechanical factors in piano playing, and shows how to acquire a good posture with perfect alignment of head, neck and torso for an efficient, well-coordinated technique. For this, she is assisted by *Glenna Batson*, a teacher of anatomy at Salem College.

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Prevention and Rehabilitation of Occupational Injuries in Musicians

Dr. Elena Pronkova, Tatiana Melnikova, Physiotherapist
and Prof Galina Minsker

THREE RUSSIAN specialists in the field of MUSICIANS PHYSICAL AND PSYCHOLOGICAL PROBLEMS: Dr Elena Pronkova, neurologist, Tatiana Melnikova, physiotherapist, Dr Pronkova's collaborator, and Galina Minsker, piano professor at the Academy of Culture in St Petersburg, took part in the ISSTIP International Conference on 'Health and the Performing Arts' (18th October 1997) at the Royal Festival Hall, London.

Professional Pathology of Musicians

Dr. Elena Pronkova, a neurologist, is specialising in musicians injuries particularly in 'Focal Dystonia' which afflicts instrumentalists, sometimes at the height of their career. She works in close collaboration with Tatiana Melnikova who offers various treatments and therapies. Dr Pronkova has been given facilities to work with the students of the Tchaikovsky Conservatory in Moscow, who are at advanced stages in their studies and should be prepared to cope with the strain of the profession. She also works with young pupils in several Music Schools, their ages varying from 6 to 17 or 18 years. She may see about 300 music students in any one year. Dr Pronkova presented the following communication on her findings.

Musicians Professional Pathology

These problems are mainly caused by over-use or over-training. As early as the 1960's doctors and musicians began to study these problems but the principles of how to treat them or how to prevent them were not yet well worked out. As a result many musicians had to abandon their career.

In recent years, the approach took on a scientific orientation with research into the clinical features of professional injuries aimed at establishing a special regimen of training musicians. The first experimental studies used 180 musicians; 130 were in the clinic and 50 attended the clinic at various intervals, to evaluate their progress. These experiments investigated the intensity of muscular activity to detect the early signs of injuries. When investigating the muscular activity while practising, the methods included

electromyography, dynamometers or testing blood circulation to evaluate the hemodynamics and vegetative imbalance.

These observations made it possible to reach certain conclusions to establish the main forms of pathological processes based on the forms and mechanism of the on-going processes. The two main features presented are (a) muscle diseases and (b) professional dyskinesia (dystonia). Each one presents its own pathogenetic differences in the clinical work.

Muscle Diseases occur usually as a result of over-use, over-training and over tension but these can also be caused by illness, usually an infection which affects the physical stamina. We find that young students striving to achieve technical perfection and professional skill are more prone to such injuries than more advanced and experienced performers. The muscles of the young musician are not yet fully developed. Thus, in our conservatoires and Music Schools the usual pattern presents injuries in students in final stages in Music Schools, and in the first years of the Conservatory. We also found that women seem to be afflicted more than men, and that pianists, accordionists, bayanists have problems with their right hand as a rule while string players with their left hand.

I believe that while the main causes of muscle injuries are over-use of the body and muscles and a wrong regimen (lack of exercise, wrong diet) there may be other external stimulus which affects the metabolism and other physical or physiological factors. These depend on the levels of changes in muscle and tissues supporting the movements of arms and of the playing apparatus and of the level of infringement on the peripheral nervous system.

Progressive Therapy is recommended in nerve-muscle injuries in musicians:

- (a) analgesics - to bring peripheral blood circulation to normal level
- (b) medication giving high level of energy to establish the acid-alkaline balance
- (c) use of ultra sound
- (d) acupuncture - daily sessions, courses of 10 or 15 days; when necessary a second course is given at 10 or 15 days interval

Developing as a Musician

is the title of Tatiana Melnikova's presentation. Tatiana Melnikova gave first an outline of the proceedings of the first International Seminar on 'The Treatment of Musicians Injuries' organised by Dr Elena Pronkova and herself in April 1997 at the Moscow Conservatory, under the auspices of Professor Mikhail Ovchinnikov. The Rektor, Doctors, teachers and musicians from USA, Israel, Lithuania and specialists in this field from Russia took part in the seminar.

As a result of this first encounter between the medical and musical professions, it became clear to the organisers that what was needed was to set up a Foundation and create a **Centre of Studies** where musicians afflicted by occupational disorders could be treated and, at the same time, develop a programme incorporating techniques to prevent and to treat the physical and psychological problems and injuries.

This project has found support among most influential doctors and musicians as well as from institutions and firms concerned with the wellbeing of musicians.

As the title suggests, the project would involve the *growth of musicians* through various stages of their development, from the earliest to the most advanced.

(1) Children are exposed from the earliest stages, to the method of 'Sonata' developed by the Laboratory Valeology at the Moscow Institute for Improvement of Professional Skill. This method is based on the study of M. L. Lazarev on the influence of music on the foetus during pregnancy. This was tested on 200 pregnant women between the years 1988 and 1996. The result of such a preparation showed that children exposed to this treatment were ahead in their musical ability and aural perception compared to the children of the same age who were not submitted to this type of therapy.

(2) The well known teacher, Valeria Guterman, introduced her method of working with children between the ages of two and eight, prior to their formal music education. She uses a *set of games* to help the children to develop a system of well organised movements needed in piano playing. These games aim at developing the skill needed to

coordinate the movements, while appealing to the child's imagination. The results so far have been most encouraging.

(3) Professor *Vladimir Maiorov* teaches at Kaunas High School, in Lithuania, working with pupils between the ages of 15 and 20 years. He has been trained both as a doctor and as a musician and he made a special study of instrumentalists' problems. He has evolved an anatomo-physiological technique which he has presented in great details in his book 'The Musicians Hands'.

Professor Maiorov has collaborated closely with the well known Israeli physiotherapists *Shmuel Taat*, now established in New York and working with musicians suffering from various injuries.

(4) A method of 'self-treatment' for stress and anxiety in performance has been developed by Doctor *Vitaly Builin*, in conjunction with the Moscow firm 'Engineering'. He has devised a portable laser, emitting low-frequency waves, which can be used by the musician himself, once he has learnt how to control the device. Dr Builin uses these low-

frequency lasers to stimulate the system of adapting to stress.

Thus the physiological responses to anxiety before a performance are calmed down. The musician is able to tone down the device and use it to suit his needs.

The work with advanced music students is discussed by *Prof Galina Minsker* from St Petersburg Academy of Culture in the following communication.

Pianists' Problems — Prevention and Rehabilitation

In my opinion, the teacher plays a central role in the prevention and rehabilitation of physical problems and injuries in musicians. Whereas remedial therapies are primarily aimed at the removal of symptoms, an appropriate pedagogical approach can directly eliminate the cause of pain and discomfort. Unfortunately very few teachers have the necessary knowledge and understanding of the anatomical and physiological functioning of the human hand and the playing apparatus. In the early twenties, Professor Ivan Kryzhanovsky - physician, composer, pianist, painter - pioneered an integrated approach to piano playing. He treated piano students at the Petrograd (St Petersburg) Conservatory by teaching the underlying anatomical and physiological principles in piano playing. (I. K. Kryzhanovsky 'Physiological basis of Piano Playing' Petrograd 1922). Many well known Russian pianists were greatly influenced by his ideas. Among his patients were George Kochevitsky - author of 'The Art of Piano Playing - A Scientific Approach' (Sammy Birchard Co. 1967) and Anna Schmidt-Schlovskaya who developed her own pedagogical approach based on his method of treating pianists afflicted by physical problems or injuries while using her own approach to piano playing which she has learnt from her great teacher, Felix Blumenfeld who was also Horowitz' teacher. At about the same time, another pianist, Valentina Guterman, a student of Konstantin Igumnov, set up her school in Ecaterinburg where she helped pianists with occupational injuries. Both Schmidt-Schlovskaya and Guterman emphasise the natural bio-mechanical and

evolutionary processes which take into consideration the spiritual and the physical unity of the students, aiming at achieving integrated artistic piano playing. This cannot be realised without a thorough understanding of all the physical, physiological and psychological processes: the pianists attitude towards his studies and his instrument, the hearing-feeling factors, (kinesthesia) the importance of a good posture, attention to breathing, maintaining a feeling of ease while playing and developing a technique with correct movements of arms and fingers, experiencing the use of arm-weight at the same time having great control of the keyboard with a diversity of touches and bringing out the singing quality of the instrument. Relaxation was the vogue, based on Breithaupt ideas, which swept the European piano scene at that time.

Schmidt-Schlovskaya realised that relaxation alone was not the answer. She believed that there was a need for activation of the muscle tone to develop the endurance of the playing apparatus through the use of the natural function of the human hand: 'the holding', 'the taking' which develop the movement of the first phalanx of fingers as well as of the hand muscles - vital movements in piano playing. Schlovskaya's treatment started with a few gymnastic exercises and then working at the instrument in the retraining of the piano technique based on her principles of tension/relaxation, addressing the importance of controlling the mental - aural image of the musical score associated with the muscle feeling and muscle activity. She devised a set of

stretching exercises which proved helpful in the treatment of ganglions, gigromas, tendinitis. She believed in developing more independence in the finger technique while allowing the pianist's creative individuality to flourish. In general, the treatment took about six weeks to retrain the student's approach and to acquire a healthy piano technique. Many injured musicians came to Schmidt-Schlovskaya and to Guterman from all over the country and today, those who were trained by them are carrying on their good work.

Some of Schlovskaya's pupils - including myself - are giving special courses for music teachers and students in Music Schools and Conservatories in different parts of the country while Guterman's students are doing similar work in Ecaterinburg (Elise Elphatova has founded a Music College there) as well as in different parts of Siberia.

However, the contact with teachers through courses of further education is short and not so effective. Our goal was to set up a systematic training of students and with this in view we set up the *Piano Pedagogy Department* at the St Petersburg Academy of Culture where my colleagues and myself conduct regular practical seminars on prevention and rehabilitation of pianists' occupational disorders.

Our goal is to establish a *Centre of Studies in Moscow*, together with my colleagues - Dr Elena Pronkova and the physiotherapist Tatiana Melnikova, now that ISSTIP RUSSIA has been founded and we can collaborate with our colleagues in this field in other countries.

ISSTIP RUSSIA (President *Tatiana Melnikova*) is planning a ONE DAY seminar at the *Tchaikovsky Conservatory in Moscow* in October 1998.

ISSTIP ARGENTINA (President *Dr Lydia Spitz*) seminar in November in Buenos Aires on performers' problems.

ISSTIP organised a ONE DAY International Seminar in Nicosia (Cyprus) on 5th October 1998, during the 20th **European conference of EPTA Associations** (President *Katerina Antoniou*).

Causes and cures of focal limb-dystonia in musicians

Prof. Dr. med. Eckart Altenmüller, M.A.

Neurologist and Neurobiologist, Director of the Institute of Music Physiology and Performing Arts Medicine Hochschule für Musik und Theater Hannover

Apollo's Curse

"I remember very well. It was the final rehearsal with orchestra. We played Mozart's Piano-Concerto in D-minor. I love this piece and I have played it more than twenty times under various conductors. From the very beginning of my first solo in the first movement, I realised, that something had changed with my right hand. My little finger touched two keys when I played the first interval, an octave. This never happened before. During the subsequent semi-quavers, I felt some lack of control of my ringfinger and my little finger. I had the impression that these fingers developed a sort of 'own way' of life. With many efforts, I passed through the rehearsal. I thought, it had something to do with the flight and the timelag. After all, according to my biorhythm, it was four o'clock in the morning. In the afternoon, I worked the piece slowly and forte with no difficulties at all. Great relief. But as soon as I tried to accelerate and to play the original tempo, the ringfinger and the little finger of my right hand curled in, as if the tips of the fingers were drawn towards the palm of the hand by irresistible magnets. I was desperate. Panically, I changed fingerings and tried to play difficult passages only with the first three fingers. Somehow, I survived the performance, but my road to Calvary had begun" (C.P., German concert pianist).

What this pianist describes, are typical conditions of a starting **focal dystonia**. Focal dystonia - also referred to as musician's *cramp*, or *occupational cramp* - presents as a loss of voluntary motor control in extensively trained and refined complex movement patterns. In most cases, focal dystonia is highly disabling and may end a professional career as a performing artist. Subtle loss of control in fast passages, 'curling in' of fingers, lack of precision of 'forks' in woodwinds, irregularity of trills, 'sticking fingers' on the keys, involuntary flexion of the bowing thumb strings, all these various symptoms can mark the beginning of the disorder. At this stage, most musicians believe that the reduced precision of their movements is due to a technical problem. In consequence they intensify their efforts, but as a result the problem gets worse. Since passionate musicians have devoted

their life to music, the disorder affects them in the centre of their personality. Gaining self-esteem and income from their musical abilities, it invariably is a psychologically devastating condition. According to our observations on a large number of professional musicians, focal dystonia is more common in highly talented performers. *Apollo's gift*, the talent to move souls by playing music, seems to be reversed to the curse of everlasting desire to play music, doomed to everlasting failure.

Focal Dystonia is still a challenge to any doctor and researcher working in the field of performing-arts medicine. Up to now, no cure is available. Any treatment improving the condition is difficult to obtain. For researchers, focal dystonia raises many questions. It is unclear, whether the pathological condition is due to a dysfunction of the basal-ganglia or the sensory-motor cortex. It remains open to which extent psychological factors contribute to the disorder. Furthermore it seems that certain risk-factors may initiate or accelerate the development of focal dystonia. Avoiding them will be an important step towards prevention.

In the present paper, symptoms, epidemiology and the results of treatment in 40 professional musicians suffering from focal limb dystonia will be presented. All patients were seen and treated personally by the author during the past two years in the Performing-Arts Clinic in Hannover. Starting from observations made in our group of patients we will put forward some ideas concerning possible risk factors and the origins of focal dystonia. Although in brass-players and wood-wind players focal dystonia can present a loss of control of facial embouchure muscles or tongue muscles, we will concentrate on focal dystonia of hand movements since the latter disorder is much more common.

Some strange symptoms in focal limb-dystonia

Neurologists are fascinated by musician's *cramps* because of some strange phenomena accompanying the disorder. At first glance, some characteristics of focal limb dystonia seem to be incompatible with the view of an organic disorder of the

central sensory-motor system. One of the strange phenomena is the *'task specificity'*. In the majority of cases, focal dystonia is only present in the context of instrument playing. It might be present when playing the clarinet, but not when playing the saxophone. Another strange phenomenon is the fact that the coordination problem usually *highly depends on the somatosensory input*, for example from the skin of the finger-tips. We have seen two pianists who had focal dystonia almost exclusively when playing on ivory, but not on plastic keys. Playing with a latex-glove usually improves the condition. However, this effect is not stable and fades away after some minutes of playing. Any modification of posture and even facial grimacing may have an influence on the dystonic movements and the degree of incoordination (Wilson 1996). Again, this is probably due to the change of afferent somatosensory input to the central nervous system.

Another interesting phenomenon is revealed by the analysis of the patterns of dystonic movements. It seems that movements that are practised too long in the context of music making are affected more often. In pianists, the loss of coordination shows up most often in the ring finger and the fifth finger of the right hand. This problem was experienced by Gary Graffman and Leon Fleisher, probably by Robert Schumann and by the pianist cited above. Every pianist knows that the ring-finger is a 'problem finger' in terms of independent action and force required when playing. The second frequent problem in pianists is a loss of coordination of the thumb of the right hand. Involuntary contraction or extension hampers the playing of scales. Scale playing and early positioning of the thumb is another typical pianistic problem that has to be practised extensively. In wood-wind players, the hand supporting the instrument and doing fingering at the same time is most often affected. In clarinetists and oboists it is the right hand, in flautists the left hand.

Especially in flautists, left hand support is a common problem, because it is difficult to do fingering with the left thumb and the index finger and at the same time support the flute with the base of the left index finger.

Focal dystonia often occurs together with *focal tremor* as an associate symptom. When observing the dystonic movement, increased tremor amplitude (when compared to the unaffected movement of the other hand) can be recognised in more than 50% of the cases. In a few cases, dystonic tremor can be observed as an isolated, but equally disabling symptom.

According to Kaji et al. (1995) isolated focal tremor can be interpreted as a 'minus' variant of focal cramping, characterised as a lack of activation of appropriate muscles in contrast to the overshooting activation in focal dystonia.

Which musician is at risk to develop focal limb dystonia?

Comparing musicians to other professional groups using skilled finger movements, for example dentists, surgeons, watch-makers, or professional writers, focal dystonia clearly occurs more frequently in musicians. The prevalence of focal dystonia in musicians (i.e. the number of musicians suffering from focal dystonia at a given time) is among 1:500 and 1:200. In other professions required skilled hand movements it is about 1:3400 (Nutt et al. 1988). The increased incidence in musicians has to be related to the specific qualities of sensory-motor skills. Playing an instrument at a professional level is probably the most complex of all human sensory-motor activities. The temporo-spatial accuracy of movements is extremely controllable by both the musician and the audience. Especially in classical western music, liberty in execution of music decreases year by year, due to the technical 'standards' set by easily available recordings and by the high calibre of performers - at least with respect to their technical skills. Furthermore, music making differs from other professions by its close connection with emotion. Finally, playing an instrument usually starts at an early age and the routines for the stereotyped movements are rehearsed for extended periods of time with gradually increasing degrees of complexity.

A closer look at the group of patients treated in our clinic may reveal *risk-factors* for developing focal dystonia. Some statistics concerning the type of instrument, the professional position and other circumstances are shown in **Table 1**. Summarising Table 1, it emerges that *focal dystonia* occurs predominantly in male soloists, playing classical music. It is more frequent in pianists and in guitarists. This might be due to the overall 'time spent with playing the instrument. Pianists and guitarists are known as 'heavy workers', rehearsing on average more than four hours a day. Time of practising the instrument, personality type and professional position are closely linked. To be music loving, ambitious and

perfectionist is a prerequisite for becoming an outstanding performer.

Two details from Table 1 should be emphasised. First, there is evidence, that a genetical predisposition plays a role. In about 10% of the patients, we found a history of writer's cramp in first grade relatives. A pair of monozygotic twins, both professional flautists, developed independently from each other focal dystonia of the left hand at different stages of their career. Interestingly they showed dystonic patterns.

The second detail is even more important. More than a third of our patients has a history of chronic pain due to tendinitis and overuse, or nerve compression of one of the arm-nerves. Other investigators have pointed out the crucial role of ulnar nerve compression in pianists developing the Leon-Fleisher-type of dystonia (Charness et al. 1996). *Preventing these musicians from developing chronic overuse and tendinitis will most probably prevent them from developing focal dystonia.* On the other hand, when after years of chronic pain a musician has developed focal dystonia, the cure of the pain syndrome or of the nerve compression will not improve a dystonic movement pattern once established.

In summary, the development of focal dystonia in musicians is related to the intense and prolonged practice of fast and highly precise externally predefined

actions. Movement patterns, which are extensively worked on and which require force and skills in one hand at the same time seem to be predominantly affected. Freedom of interpretation in most improvising musicians and freedom from external professional pressures in amateurs seems to be a 'protective' factor.

Focal limb-dystonia in musicians may have different causes

According to the literature and to the observations in our group of patients, it is clear that there is not one single cause for developing focal dystonia. *Focal dystonia is a symptom which may have different origins.* The discussions on the origins of focal dystonia, whether it is an organic or a psychogenic disorder, or whether it is a disorder of the basal ganglia or of the cerebral cortex do not take into account that a variety of underlying pathological conditions might lead to a similar symptom. In Fig. 1, the most common pathological conditions which may lead to symptoms of focal dystonia are related to each other schematically. Usually, neurological examination does not reveal any further abnormalities. Additional neurophysiological and neuroradiological investigations typically are normal and therefore not very helpful in classifying the focal dystonia with respect to the underlying pathology. Future research has to develop methods for classifying the different types of 'focal dystonia' in musicians. Only in the cases of symptomatic dystonias, following chronic pain, nerve-compression or trauma, a clear-cut attribution can be made. Since one risk factor is the pathological afferent somatosensory input, the somatosensory system seems to play an important role for the pathogenesis of focal dystonia. In a recent study conducted in trained monkeys, Nancy Byl and colleagues (1996) could demonstrate that chronic overuse and repetitive strain injury in highly stereotyped movements can actively degrade the cortical representation of somatosensory information guiding fine motor hand movements in primates. Such a 'blurring' of sensory feedback information in the human cortex could be one cause of focal dystonia. But, since chronic pain or nerve compression lead to focal dystonia only in a small percentage of cases other factors such as a genetical predisposition must play an important role.

In musicians without any history of pain and peripheral nerve compression a different pathogenetic mechanism has to be considered. We suggest that the highly task-specific and non-progressive forms of focal dystonia might represent disorders of motor subroutines stored partly in the supplementary motor area (SMA). The SMA is a cortical area situated anteriorly to the primary motor area. This region is

Table 1

**Which musician is at risk to develop focal limb dystonia?
n=40 patients (1995-1996)**

1. **Males (78%)**
2. **Classical musicians (81%)**
3. **Certain Instruments:**

Pianists	=	34%
Guitarists	=	28%
Strings	=	15%
Woodwinds	=	15%
no doublebass-players		
4. **Certain Positions:**

Soloists	=	65%
Performing Teachers	=	20%
Tuttists	=	5%
Students	=	3%
Amateurs	=	5%
5. **Personality:** music loving, ambitious, perfectionistic, control-type
6. **Genetics,** e.g. writer's cramp in the history of the family: 9%
7. **Pathological somatosensory afferent input in 40%**

Chronic pain syndromes	=	25%
Acute overuse	=	8%
Nerve compression syndrome	=	8%

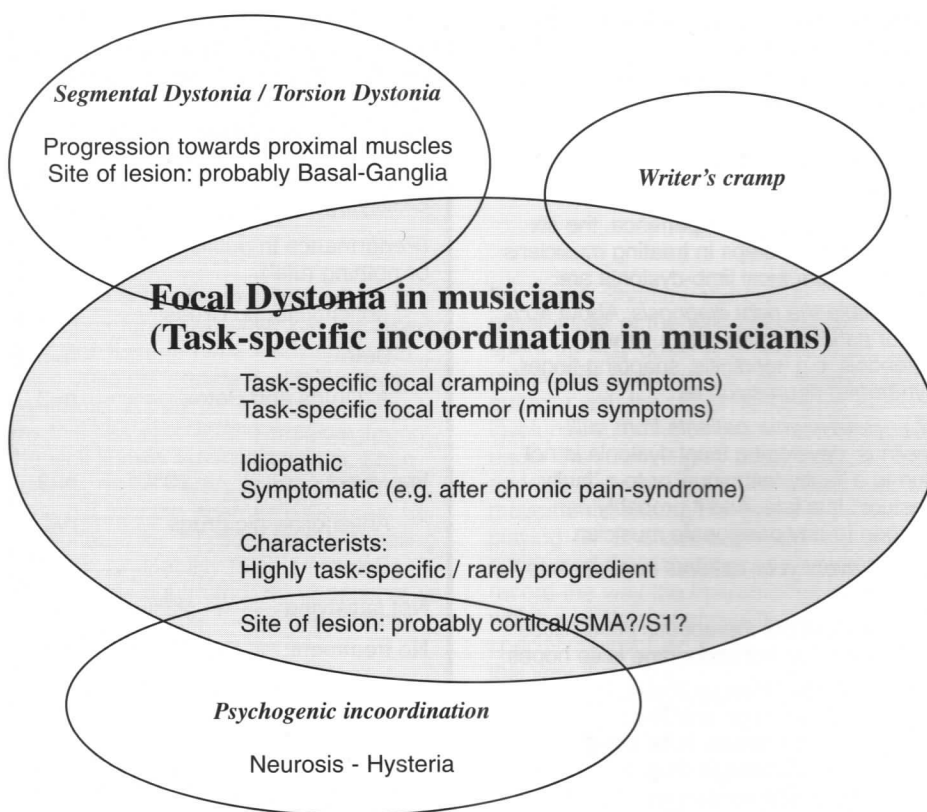


Fig. 1

known to play a crucial role in the acquisition and storage of skilled movements (Roland et al. 1980). The SMA is influenced by neuronal projections from the somatosensory cortex, from the prefrontal cortex and by complex neuronal circuits between the cerebral cortex, the basal ganglia, and the thalamus. The high specificity of the disturbance could be an argument in favour of a disorder of the cortical representation of movements. In a simplifying manner this form of focal dystonia could be considered as a *cortical sensory-motor mislearning syndrome*, or as Hunter Fry (1996) puts it as a 'computer virus' in the sensory-motor programs essential for playing music.

In a smaller group of musicians, there is a *close relationship between musician's cramp and other dystonias*. In our group, writer's cramp and musician's cramp is associated in seven patients. Writer's cramp presented synchronously or some months to years after focal dystonia at the instrument had become apparent. In rare cases focal dystonia manifests as the initial symptom of a segmental dystonia or a generalized dystonia. These disorders progress slowly and include step by step larger groups of muscles. The underlying pathology is located in the basal ganglia (for a review see Sheehy and Marsden 1982).

Finally, there is a small group of patients suffering from focal dystonia due to a

psychogenic origin. These patients develop incoordination in the context of a neurosis. It is difficult to distinguish a psychogenic incoordination from a non-psychogenic. We have the impression that the pattern of psychogenic incoordination has a more demonstrative character with sometimes strange and 'expressive' motions. There are no data available on the long-term outcome in these patients. We suppose that the spontaneous remission of focal dystonia seen occasionally might predominantly occur in these patients.

From the origins of focal dystonia to the treatment

Evidently different origins of focal dystonia require different therapeutical approaches. In Fig. 1, a simplified diagram of our understanding of the pathological mechanisms in 'focal dystonia as a sensory-motor mislearning syndrome' is shown. As a hypothesis, we suggest that a faulty sensory motor program has been established. This program most probably is located in the supplementary motor cortex (SMA, dark dot). The SMA receives neuronal signals from the somatosensory cortex (S1), explaining the effects of somatosensory input on the incorrect motor program. Furthermore, the SMA is influenced by the prefrontal cortex (PF) explaining the *paradox that motivation and will to overcome the dystonic pattern usually increases the involuntary muscular contraction*. Projections from the SMA are directed towards the primary motor area (M1). In the M1 area, the complex motor sequences programmed in the SMA are realised by neurones controlling small groups of muscles. However, the human sensory-motor system is far more complex. Sensory-motor control depends on large neuronal circuits involving the cerebellum, the basal ganglia and the thalamus. In focal dystonia, these neuronal circuits seem to play an important role. *Anticholinergic drugs*, which predominantly influence neurotransmission in the basal ganglia, are in many cases helpful in the treatment of focal dystonia. According to our experience, trihexiphenidyl (Artane®) is the most effective substance.

The aim of treatment must be '*establishing a new sensory-motor program*' (grey dot). This can be done by using different methods. One possibility is modification of the instrument, e.g. alteration of the position of keys in wood-winds. In young string-players, reversal of the posture with left hand bowing can be useful. More difficult is the change of motor programs for pianists. The 'Horowitz-type' of

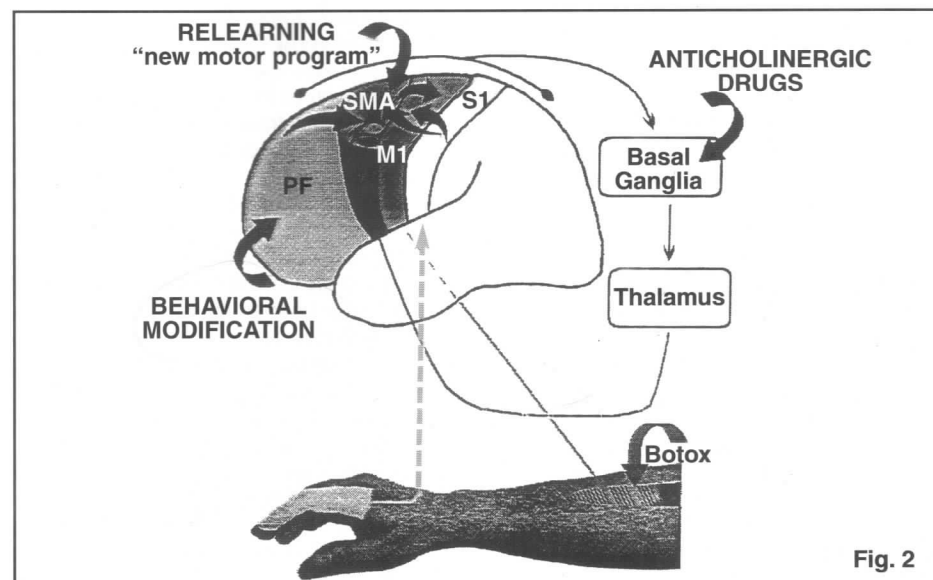


Fig. 2

re-programming means changing of a curled finger-position to an overstretched. However, clearly not in all instances can such a 'simple' solution can be found. Technical retraining by certain teachers and neuromuscular re-education (e.g. Feldenkrais-Technique and Alexander-Technique) may be helpful in some cases, although in our experience, functional recovery to a high technical standard has been an exception.

Another way is to 'force' the central nervous system to develop a new sensory-motor program. This can be achieved by changing the 'peripheral' muscular conditions with local intramuscular injections of *Botulinumtoxin A* (Botox). Botulinumtoxin reversibly weakens the muscles by blocking the nerve impulses to the muscles. The effects of the toxin last about two to three months. As an example, in the Leon Fleisher type of dystonia, weakening of the flexor muscles of the ring-finger and the 5th finger has two effects. It directly helps to overcome the involuntary contraction, but - even more important - it can help to develop a slightly different type of wrist position or finger posture. The new finger position can serve as a new 'virus-free' sensory-motor program. It is very important to tell the patients that not the injection *per se* is the cure, but that the injection gives them a chance to develop 'involuntarily' a modified sensory-motor program. Details of the method have been published previously in German (Altenmüller 1996, Altenmüller et al, 1996).

Finally, it is crucial to consider the *psychological factors* when treating patients with focal dystonia. The frustrating dystonia-paradox mentioned above should be an occasion to reflect upon our attitudes concerning the playing of an instrument and the life as a musician. It is important to keep in mind that *musicians play music and not 'work an instrument'*. Helping the patients to break out of their prisons of drawing all attention to the coordination problem, helping them to widen and free their mind, enabling them to develop a perspective for the future is very important.

What can performing-arts doctors do for patients with focal limb-dystonia?

The treatment of focal dystonia remains a difficult task for the performing-artist's doctor. Improvement of the symptoms can be attained in most cases, but it is understandable that for many patients this is not enough. They want *all or nothing!* Once having played as a soloist Tchaikovsky's B-flat-minor concerto with the Berlin Philharmonic, it is not easy to accept limitations to a certain literature, or to perform on a lower technical level in a small town. How to deal with this problem must be part of the psychological support and must be considered when developing future perspectives with the individual patient. As a general rule, complete

recovery cannot be achieved. Even under optimal conditions, some restrictions with respect to the accessible literature or to the tempo and power of certain movements will remain. The results of treatment in our group are summarized in Table 2.

In conclusion, in our experience, the six most important steps in treating musicians suffering from focal limb-dystonia are:

- (1.) *Make the right diagnosis:* About 40% of our patients came with a wrong diagnosis, e.g. tendinitis, snapping-finger syndrome, depression etc.
- (2.) *Relieve your patients from guilt-feelings:* developing focal dystonia is not due to a 'faulty technique' or to a 'faulty posture'. It is fate. And it probably can happen to any passionate musician.
- (3.) *Prevent your patients from useless cures.*
- (4.) *Discuss the therapeutic possibilities realistically.* Do not encourage false hopes.
- (5.) *Pragmatic therapy should include anticholinergic drugs and Botox.* Trihexyphenidyl seems to be the most effective anticholinergic drug; Botox help to develop a new sensory-motor program.
- (6.) *Your patients need steady psychological support.* Help them not to look back all the time deploring their misfortune, but to develop new perspectives.

Summary

Sensory-motor skills of musicians have some specific qualities: learning begins at an early age in a playful atmosphere. Routines for stereotyped movements are rehearsed for extended periods of time with gradually increasing degrees of complexity. Via auditory feedback, the motor performance is extremely controllable by both, performer and audience. These specific circumstances seem to play an important role in the development of focal limb dystonia, also referred to in the medical literature as *occupational cramps* ("violinist's cramp", "pianist's cramp"). Characteristically, focal dystonia presents as painless muscular incoordination or loss of voluntary motor control of highly trained movements while playing the instrument. The incidence of focal dystonia is increased in musicians when compared to other professions demanding skilled hand-movements. In most cases, this condition is disabling, and frequently ends a professional career. In the present paper, the symptoms and epidemiological data of 40 musicians treated presently in the Hannover Performing Arts Clinic will be summarised. Possible risk factors and the different hypothesis concerning the origin of the disease are discussed. The outcome of treatment is reviewed. The best results are obtained by treatment with anticholinergic drugs and/or local injections of Botulinum-Toxin-A.

Table 2

Outcome of treatment in focal limb dystonia? n=40 patients (1995-1996)

Satisfying:	40%	n=16
(Performance in public, but not 'all - or nothing rule')		
Anticholinergic Drugs:		n=8
Botox:		n=5
A. Drugs and Botox		n=3
Improved:	23%	n=9
Anticholinergic drugs		n=2
Botox		n=7
Not satisfying:	23%	n=9
No treatment:	15%	n=6

Presentation given at York Conference "Health and the Musician" March 26 1997.

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Fleisher Syndrome

Carola Grindea

Piano Professor Guildhall School (1968-1989), Co-Director ISSTIP Clinic at LCM

There is hardly an article or a communication on 'Focal Dystonia' (the 'Cramp') in a medical journal which does not equate it with 'Fleisher Syndrome'. It may be understandable why this has entered the 'medical jargon'. The well known American pianist, Leon Fleisher, made history in 1982, when he came out into the open admitting that he had suffered for 17 years from a crippling condition, an inability to control two fingers in his right hand. He underwent an operation for 'carpal tunnel syndrome' (wrongly diagnosed) at the Massachusetts General Hospital in Boston, performed by a team of specialists: a neuro-surgeon, an orthopaedic surgeon and a neuro-physiologist who had the courage to operate on the pianists hand. (ISSTIP Journal No. 1, 1993 pp33-34). It took seventeen years of damaging wrong diagnoses and treatments until this was decided and when he managed to play (Cesar Frank 'Variations Symphoniques') with both hands the event was televised nationally. After that one-and-only performance, Fleisher was again in constant pain so he reverted to his teaching, conducting and playing repertoire for left hand only.

Fleisher's operation made an extraordinary impact on the profession particularly when another famous pianist, Gary Graffman, came to the Boston hospital with the same complaint and when, within one year, not less than five hundred other pianists flocked to see those celebrated doctors in search of a cure!

At first this incoordination was diagnosed as 'Carpal Tunnel syndrome', then it was known as 'Overuse Syndrome' and only later the doctors referred to it as 'Focal Dystonia' or 'The Cramp'.

The medical profession was getting confused by the complexity of this condition and soon it became the subject of many studies by medical specialists in USA and in other countries who started to research this hitherto unknown field.

ISSTIP had only recently been founded in London (1981). We became very interested in this unusual condition and wanted to find out about it as well as about the newly established Programme of Studies initiated at the famous Boston hospital.

I had the opportunity to visit it in 1983 and had the privilege to meet Dr.

Bhagwam Shahani; the neuro-physiologist of the well-known team. I spent the day observing him and his colleagues examining a new 'patient', a guitarist with the usual symptoms, an involuntary curling of one or two fingers under the palm. Highly sophisticated apparatus were used to monitor all the movements, filming the guitarist while playing. Dr. Shahani explained how they conducted their studies, using a video to record the way the instrumentalist plays which was then analysed by all the specialists involved in the programme. In this way they could assess the cause, or causes, and what therapy to recommend.

He then asked me how I would approach such a case.

I admitted that this was the first time I had actually seen such a condition. At that time I was convinced that *tension* was at the root of all problems (*I still believe this!*) and I proceeded to explain how I would try to help the guitarist. First of all he had to learn how to relax his body and his arms, then acquire a correct posture and, only then, to learn to hold the guitar without any stiffness in the joints and muscles. Once he had achieved this he could start playing. At the slightest stiffening anywhere I would stop him so that he developed a new awareness of what it feels like when the body is free of tension. I emphasised that this process of re-education cannot be done immediately, the player has to try again and again until he can relax muscles immediately, at will.

Dr. Shahani talked a great deal about Graffman and his condition. Shahani was against the operation as, by now, the doctors were having doubts whether they were dealing with carpal tunnel syndrome. He had been treating Graffman for the past 18 months, using 'biofeed-back' therapy and had built a special, highly sensitive apparatus, which recorded the slightest tension in any muscles in the pianists' arms. Even when Gary was convinced that his hands and arms were totally relaxed, the apparatus recorded some residue of tension. They worked together, very intensely aiming at a '*retraining of the whole motor-sensory system*'. Which must have had good results. Dr. Shahani had written a paper about this 'break through', and he showed me photographs of Gary's hands which looked perfectly 'normal', without any dysfunction. He had made a number of tapes playing with both hands and Dr

Shahani was convinced that Graffman was now able to return to his career. I ventured to ask whether what was good for Gary when playing in his studio or for a few friends would also serve him when performing in a large hall. He must have had second thoughts also as he continued to perform only for the left-hand repertoire.

In spite of the many years of research, Focal Dystonia is still considered by specialists in the field as 'resistant to therapy', (A.H. Lockwood 'New England J. of Medicine No 4 Jan 1986'); 'complete recovery cannot be achieved' and 'up to now no cure is available' (Altenmüller, Wilson, ISSTIP J. 9, Sept 1998).

However, FLEISHER PROVED THEM WRONG.

After thirty-two years of being unable to use his right hand, playing only the repertoire for left hand, Fleisher started to play again in public, with both hands. He made history once again, when, in January 1996, he appeared at Carnegie Hall, performing Mozart Concerto K414 with Andre Previn conducting. "*Leon Fleisher to play with both hands in Carnegie Hall*"—was splashed across front pages of newspapers. To the ordinary reader such an announcement may appear out of place at a time when world crises are causing grave concern. But for the piano and the medical professions, this was indeed great news. Especially that since that concert, Fleisher has appeared in USA, in Europe and elsewhere and he can play again the most demanding works of piano literature, even Brahms Second Concerto (which Brendel refuses to include in his programmes).

How did he do it?

In an interview in New York Times (January 1996) prior to the Carnegie Hall appearance, he admitted that he found great help through 'Rolfing', a therapy which uses deep, very painful massage, stretching the muscle-fibres and bringing a correct alignment of joints and muscles.

The question is: Could Rolfing alone have achieved this dramatic reversal? I have doubts, and so do some of my colleagues, considering that many pianists suffering from dystonia have tried the therapy unsuccessfully.

It is revealing to read further in the interview that 'he had been taking ballet

lessons . . . which he finds most exhilarating and beneficial'. Moreover, Fleisher's attitude to his own playing and to his teaching has taken new directions. He is more concerned with the young pianists wellbeing and how they relate to the instrument. He insists that they do a lot of exercise, especially stretching exercises and even recommends that they take dancing lessons!

It is interesting to read in various medical journals that a number of specialists in dystonia admit 'technical retraining by certain teachers' . . . 'as a most encouraging approach to treatment so far' (R. Norris 'The Musician's Surviving Manual' 12 p.94) Scott E. Brown . . . 'relaxation techniques and laborious retraining . . . have been of some benefit' (Musicians' Western Journal of Medicine v.157, 6, 1992 Dec). Thus, Dr. Shahani's approach as early as 1982, is proving 'most beneficial' also in Fleisher's spectacular recovery.

More recent studies in France, based on 'correcting poor posture and musculature imbalance through a programme of re-education of the whole upper limb, shoulder girdle and the spine' had remarkable results (Prof Raoul Tubiana and Philippe Chamagne, BAPAM Newsletter, Autumn 1995 pp 23-32; see Raoul Tubiana ISSTIP J.9).

My visit to the Massachusetts General Hospital and the subsequent study of its research programme were a real eye-opener for our work in ISSTIP and particularly for my own studies.

When the first dystonia cases came to ISSTIP 'Performing Arts Clinic', which was opened in 1990 at the London College of Music, I tried to apply what I have learnt from Dr. Shahani. We do not use biofeed-back therapy as we do not have access to special technical equipment but I have evolved a technique - 'Grindea-Technique which 'liberates the body and mind of any tensions'. The most important factor in coping with focal dystonia is the 'retraining of sensory-motor programme', or, in Dr. Shahani's words, 'the retraining of the whole system'.

Can Focal Dystonia be cured, can it be prevented?

How can Focal Dystonia be prevented when so little is known how and when it

occurs? Altenmüller states (ISSTIP J.9 Sept 98) "More than a third of our patients had a history of chronic pain due to tendinitis and overuse . . . Preventing these musicians from developing chronic overuse and tendinitis will most probably prevent them from developing focal dystonia".

This is the approach I recommend:

1. Liberate the body and mind of any tension through *Grindea Technique* which corrects any imbalance in posture, bringing a perfect alignment of head, neck, back, correct shoulder girdle and a perfect state of balance of the body, as if it is weightless.

2. Freedom of breathing through long, slow exhaling which relaxes the diaphragm area.

3. Learn to maintain this state of balance when practising and performing. Over-relaxation is to be avoided as it brings a wrong alignment of forearm and thumb.

4. Study ergonomics—correct interaction between player and instrument—through a technique based on 'natural movements', physiologically correct, which allow muscular co-ordination to function freely. Correct ergonomics demand correct position of joints: *finger knuckles, wrists, elbows, shoulders.* (Fig 1,2,3,4)

5. Study the physiological factors in piano technique: kinesthesia, use of arm-weight and muscular energy, state of balance of body and arms, freedom of breathing.

6. Acquire a technique based on 'natural movements', in harmony with the body, not against it. These are the 'downward' and 'upward' motions of the wrist in conjunction with muscular energy and arm-weight (when necessary)—the only movements which release the tension in the wrists and arms.

7. To develop a 'healthy' finger technique, first place the relaxed hand on the keyboard observing that the fingers are elongated, almost level with the keys; the thumb should touch the key at the base of the nail, while fingers 2,3,4,5 fall higher, just below the black keys. (Fig 1,2,3,4) "The pianist's hand is a most perfect organ and the teacher's task is not to upset its natural position nor its

natural function" (V>Merzhanov Piano Journal 56 6-98). I use a technique with fingers pressing the key from the surface not by raising them first. Exaggerated finger articulation with bent fingers has been the cause of many injuries if stiffness in the wrist and arms also occurs. I recommend to use the wrist in conjunction with the hand and fingers. The finger, or fingers, are placed on the keys and muscular energy is directed to the wrist which either 'drops' or 'swings upwards', depending on the demands of the music. Not only the wrist and hand are involved but the whole arm is used also. This approach has proved helpful in many dystonia cases (39 keyboard players, also nine guitarists, one violinist-Database available).

The wrist is the player's new tool. The pianist thinks 'wrist motion' instead of 'finger movement', as he has done for many, many years. In this way he is 're-programming' his brain computer, a modified sensory-motor programme is developed. (Grindea, 'Focal Dystonia in Keyboard Players and Guitarists' ISSTIP J8 10/96).

Once the pianist finds himself able to control the keyboard, he gains confidence and his anxieties and the state of depression soon leave him. This new approach should be studied gradually, at first very slowly, until it becomes part of the automatic pilot in his technique.

Focal Dystonia usually affects advanced players, very often at the height of their career. Yet, in the past two years or so, we had to look after younger players, even students. This demands more urgency into setting up a co-ordinated programme of re-education to encourage more students—and their teachers—to study the causes of these occupational injuries and how to prevent them.

ISSTIP is certainly doing its work. The Performing Arts Clinic holds sessions at London College of Music and the students are encouraged to attend the Wednesdays sessions, *free*, to learn how to cope with the stress and the physical problems in their own studies and when performing and how to prevent them later on when they will start their career be it as performers or as teachers.

THE GRINDEA TECHNIQUE

Katerina Antoniou presented an OUTLINE of her Dissertation for the MSc Degree (City University) at the **ISSTIP Seminar in Cyprus**, on 5th October 1998.

Her Dissertation on 'Liberate the Body and Mind to Liberate the Artist Within' studied the causes and symptoms of musical Performance Anxiety and the **effectiveness of Biofeedback Training and the Grindea Technique on the reduction of Performance Anxiety.**



Photo M. de Gori

Fig. 1 Incorrect thumb position, affecting the position of wrist, elbow, bringing the whole arm in wrong alignment.



Photo Maletkovic

Fig. 2 Correct natural position of hand: thumb near the edge of the key fingers 2,3,4,5 placed higher, near the black keys. Wrist is in correct position, the 5th finger in line with the forearm, allowing the whole arm to hang, in state of balance, slightly away from the body.



Photo M. de Gori

Fig. 3 Incorrect posture and position of shoulders and shoulder girdle, (shoulders brought forward); arms too relaxed bringing wrong alignment of inner part of forearm with the thumb; elbows too near the body. This hinders the freedom of arm movements along the keyboard.



Photo Maletkovic

Fig. 4 Correct posture, correct hand position, and position of wrists, elbows and shoulders.

VIDEO REVIEW

CAROLA GRINDEA

A VIDEO OF HER PIANO TECHNIQUE
Video and Brochure £30

Video on Focal Dystonia £8 (cannot be sold separately)

Artsound Technology Ltd.
(US\$85 both Videos and Brochures)
Tel: (+44) 151-727 2893
<http://www.artsound.com>

More and more pianists, not to speak of other instrumentalists, suffer from physical problems and injuries deriving from the wrong deployment of the body whilst playing. Add to this the psychological problems and anxieties caused by performing in public and the result may be part or complete incapacitation.

Carola Grindea, the founder of **ISSTIP (International Society for the Study of Tension in Performance)**, has cured innumerable instrumentalists suffering from the most varied afflictions, consequently saving them from the dangers of cortisone injections and, more seriously, from the recourse to surgery too often recommended by the medical profession.

Carola Grindea has produced two ground-breaking videos (accompanied by a booklet) in which she demonstrates how to deal with physical and psychological disorders. One video deals exclusively with Focal Dystonia and shows a young man previously incapacitated for eight years while Carola Grindea demonstrates, by means of her special exercises and innovative piano technique, just how she did what the medical profession in all that time had been unable to do.

To use her own words:

"I strongly believe that any School of Piano Playing can be used successfully if the muscular coordination is allowed to function unhindered. This explains, perhaps, why so many pianists belonging to different schools of piano-playing do not develop physical problems. The answer is that they play without stiffening the muscles, they maintain joints and muscles in a harmonious state, sometimes because their teachers understood these imperatives or, at other times, in spite of the teaching."

In conclusion, let it be stressed that these videos with their accompanying booklet are of vital importance to every performer or piano teacher who so often are forced to come face to face with these ever-pressing problems.

Peter Feuchtwanger

Radojka Sucasca Ligutic

has completed the translation of the **TENSION IN THE PERFORMANCE OF MUSIC** - a Symposium, in Croatian, which will be published early in 1999 by "Skolska knjiga" Editions, Zagreb 10000.

Radojka Sucasca Ligutic

Professor of Psychology in Croatian Music Schools, has completed a Course on 'Coping with Physical Problems and Injuries and with Anxiety in Performance' at the ISSTIP Performing Arts Clinic at London College of Music. She is able now to help the young music scholars with their difficulties in their studies or when performing.

Voice Problems

Pamela Bowden *in the Chair, Head of Vocal Studies, London College of Music,*

Mr Tom Harris *Otolaryngologist ENT Surgeon, Director 'Voice Clinic', St Mary's Hospital, Sidcup*

and Karen Sell, *singer, voice consultant, a columnist and reviewer in The Singer!*

The session was opened by *Pamela Bowden*, who introduced the panel with a brief outline of the current activities of each in the field of voice teaching and vocal science.

The objective of the session was to consider the physical and psychological problems faced by singers and the opportunities for performers to ask for and receive help these days as opposed to the relative lack of awareness when she started her career, when she was obliged, and indeed expected, to cope alone with the stresses and strains of a busy performing career. She enumerated the many organisations such as ISSTIP, Voice Clinics, doctors and voice scientists and counsellors who are doing research and working together with singers and signing teachers. There are an increasing number of teachers taking advantage of these opportunities of discussion across the disciplines of singers, laryngologists, speech therapists and all professional voice users. There is a new level of understanding of anatomy and the vocal tract which, properly applied, can lead to better and safer singing technique. But there is still a hard core of frighteningly bad and dangerous teaching going on. She went on to give some examples and to discuss the necessity for maintaining good health through good diet, exercise, avoidance of infection and above all, sufficient hydration.

Close Cooperation between Singing Teachers and Laryngologists **Mr TOM HARRIS**

On the question of the value of a close cooperation between singing teacher and laryngologist, Mr Harris saw this as a shared experience and said that in Europe a phoniatician must be trained in ENT, audiology, and logopedics (speech therapy). There is no such requirement in the UK or USA so the relationship is tenuous - the laryngologist has a scientific background but no knowledge of the singer while the singing teacher's experience is the opposite. We come together from a position of mutual

ignorance. One of the strengths of a voice clinic is learning something of what the other is doing, and learning the other's language. It took Van Lawrence (a distinguished otolaryngologist from the USA) some twenty years to learn to decipher what singers were talking about. However, once learnt, it was found that singers are surprisingly accurate in their own descriptions, since they are in touch with their own bodies and can quickly come near to the nub of the problem. Singers have, rightly, always feared surgical procedures, especially for nodules, since immense damage can be done by stripping away the irreplaceable pearly white layer over the vocal folds, which gives the most beautiful vibrations. Equipment is now available to allow risk-free surgical procedures but not all surgeons have yet studied the effects. Basically, the sooner all singing teachers are attached to a voice clinic and all laryngologists have to communicate with singing teachers, the sooner a lot of wasted effort will be saved. There followed a discussion about the desirability of all singers developing their own potential and not striving to imitate other more famous singers. It was agreed that the most efficient voice of which they are capable is their own sound, which is a most valuable asset as an individual and unmistakable personal voice quality. A very high price is paid, mechanically, if a singer tries to sound like someone else.

The discussion then went on to the matter of preparation for performance, and release of tension afterwards. It was stressed that a singer must learn to let go of the voice after the period of high state of readiness during rehearsal and performance. An analogy was made with athletes such as sprinters who prepare for a work activity that is wonderfully efficient but also highly effortful. They too must let go at the end of a run, and carefully time their preparation to coincide with the moment of readiness. So with singers, and once this ability is learned, most problems disappear.

The proper position of the larynx for different styles of singing - opera, concert, musical theatre - was then discussed and it was agreed that above

all, the larynx must be free to assume its optimum position. It behaves beautifully if allowed to go where it needs to. The laws of acoustics are inescapable and singers can be intuitive about the height of the larynx at any given pitch and volume. It is mystifying how some singers should wish to manipulate their vocal mechanism, when they always say it feels so easy when it is right.

The discussion then considered the mechanisms involved in pitching and tone quality. Tom Harris described, with the aid of diagrams, how certain muscle groups change the length of the vocal folds and others their thickness and bulk. Singers have to learn to play all these muscles together and separate control of the visor gives basic control of the sound-giving mechanism.

Towards Healthy Vocal Performance **KAREN SELL**

'Quick fixes' reflect our age of instant gratification. If success is not immediate the credibility of the method or the teacher is immediately doubted. I am not in the business of 'quick fixes'. Learning any skill takes time, dedication, and practice. Certainly, the act of singing needs a soundly based technique where the voice functions healthily and efficiently. The less singers have to think or worry about their vocal instrument, the more freedom they have in areas of artistry and interpretation. Furthermore, the sounder the technique the less will be the likelihood of vocal damage, and few potentially brilliant careers will be cut short.

"The opera world is rich with talented American singers. We do need to ensure that Europe's most gifted young artists are prepared and equipped to compete as they should". Thus speaks the general manager of European Union Opera. It is because the American singers, on the whole, have superior technique that they are ousting the Europeans. The techniques they present are those based on multi-disciplinary study: those singers know exactly what they are dealing with. The eminent otolaryngologist Robert

Sataloff states categorically in both, the first edition and the recently published second edition of *Professional Voice*, that the more singers know and understand about their voices the less frequently they visit his clinic.

Singers and their teachers should have, at the very least, a basic knowledge of vocal function and vocal acoustics and thus be able to explain what is being done and why. How much information do singers and teachers need? As much as they can get. The main requirement is to be able to recognise what is not functioning well in the singing voice and how to correct it. It is irresponsible, particularly on the part of the teacher, to assume that one can make an accurate diagnosis and follow it with the required prescription if one does not know how the vocal mechanism works. All the *emphasis on interpretation* - so common in public masterclasses given by eminent performers - is of no avail if the recipient's technique is built on sand.

By now you should be able to guess from which direction I am coming. With the support of scientific and medical knowledge I endeavour to present nothing to a student which cannot be substantiated by scientific fact. A singer/teacher *par excellence* combines mechanistic information with the psychological and the aesthetic; but the foundation is healthy and efficient vocal function.

So what, briefly, makes for a healthy performer? The singer needs a healthy body and mind. Singing is an athletic activity and athletes need to be in prime condition. Voices have to function in heat and cold, come rain or shine, with toothache or a bad back, after arguments or quarrels, during career pressures - the list is endless. Unlike orchestral instruments which can be repaired, exchanged and upgraded, singers' instruments are personally unique. Voices can never be exchanged or upgraded, hence the need for special care. The voice is a reflection of the whole person, revealing and mirroring the personality, moods, energy levels and physical health. Singers, and all who deal specifically with voices need constructive information about vocal function, health and hygiene.

Appropriate physical exercise for the singer should have as its goal flexibility and mobility which is important for long-term health, benefitting the muscles for breathing, reducing areas of tension, encouraging vocal longevity and helping to counteract some of the effects of aging on the skeletal framework. Effective

and efficient use of the singing voice is possible into old age provided that supple rib-cage movement can be maintained to aid respiration, that there is good head and neck alignment, and that one sings regularly - at least in the daily practice of warm-up exercises. Adequate, regular sleep is vital - a healthy person should not normally require sleeping pills, and tiredness resulting from over-full days and long rehearsals is vocally damaging. If the body is tired then the voice is tired. The singer should endeavour to maintain an ideal weight with a regular, adequate, balanced diet, and an avoidance of an excess of dairy products, chips, fried food, chocolate, hot and spicy foods, tomatoes, peanuts, concentrated fruit juices, and excessively hot or cold food or drink. Eating late at night is to be discouraged, particularly if there is a tendency to gastric reflux. Good oral and dental hygiene is important too, so is sufficient hydration. 1.5 - 2.0 litres of water should be drunk every day, cutting down on caffeine-loaded tea, coffee and colas. Stress management plays an important part. Stress may be physical or psychological or a combination of both and may result in, among other things: vocal problems, sleeplessness, depression or anxiety attacks. Physical exercise, meditation, prayer; relaxation methods, Alexander Technique, Feldenkrais method, Autogenics, or self-hypnosis, may be helpful, (always remembering that specific techniques need to be learnt from a competent teacher). Smoking is taboo - secondary smoke also claims victims. Recreational drugs such as cocaine and marijuana in their various forms and strengths are dangerous. How excessive alcohol intake has to be before it affects perception and coordination may be a moot point, but where such a fine tuning of the vocal mechanism in performance is vital, the pre-performance drink is better omitted - certainly alcohol affects mucous production.

Moving on to singing technique. There are specific categories into which technical manoeuvres of singing fall. Broadly speaking - *postural, breath management, laryngeal function and resonator responses*. Each of these can be broken down into more detailed manoeuvres: agility, vowel formants, vowel differentiation, vowel modification, the singer's formant, sostenuto, vocal registration, vibrancy and so on.

Good posture is fundamental to healthy singing and is the basis for efficient breathing. Posture determines the alignment and balance of the body. Many technical problems in singing may

disappear when the body is efficiently aligned and used well. Good posture involves a feeling of lightness and ease of movement. Energy levels are high and one feels ready for action. In poor posture, although it may feel comfortable (the security of habit), there is an imbalance of muscular activity which may result in, for example, back problems, inefficient breathing, tension in the head and neck, which will cause problems for the performer. A singer must be able to move freely. No part of the body should be in a state of perceivable tension during the act of singing. For example, veins, arteries and muscles of the neck should not protrude in an alarming way, and shoulders should not rise and fall when breathing. Energy, vitality and dynamic presence are essential.

Coming now to *breath management*, the would-be healthy singer would do well to avoid incorrect information about the physiological functioning of the breathing mechanism such as: demands made on muscle groups which are impossible to accomplish; inaccurate location of the diaphragm; the instruction 'breathe from the diaphragm' - the diaphragm cannot be controlled locally; the instruction 'breathe like a baby' - adults no longer inhabit babies' bodies; the statement that because breathing for singing is natural breathing, training in breath management is unnecessary; the ambiguous statement that breathing for singing is the same as breathing for speech - the mechanism is the same, but the use to which it is put differs significantly. Also our singer should avoid breathing techniques which are based on: noisy and conscious efforts to fill the lungs with air - breath is not pulled into the lungs, it simply arrives there silently; the 'up and under' or 'down and out' or 'tuck and squeeze' schools of breathing - all three can be dangerous, as also can lower back breathing, upper chest breathing and extreme relaxation methods. Singers who have done their homework in anatomy and physiology will have no problem in discovering what is correct, and then they must find a teacher who can help them.

And so we could go on through all the aspects of technique, discarding the unsound and unfounded and replacing them with pedagogy based on the latest and most reliable findings in science and medicine. The act of singing should do no harm. Nothing suggested should violate the body. Singing teachers, choral directors and anyone else dealing with the singing voice has a particular responsibility to be correctly informed about healthy and efficient vocal function.

But no-one can know it all and we must be willing to modify what we do know as information expands. It is essential that we make every effort to keep abreast of latest developments in our own and cognate fields. We can do this through disciplined reading of relevant books and journals or attend conferences where interdisciplinary learning which is genuinely mutual, can take place. These

strategies are essential if we are to offer the best possible service to singers and other voice users.

As Richard Miller says, 'Communication of poetry and drama through cultivated vocal sound is the epitome of human expression, but it is possible only through the physical instrument itself. Artistry, then, can only be as good as function

permits. No amount of attention to the concerns of audience communication, dramatic interpretation, linguistic exactitude, artistry or musicianship can hide the flaws in the vocal instrument. Beautiful singing must be based upon beautiful vocal function and beautiful artistic imagination'.

ISSTIP CONFERENCE AT SOUTH BANK (Oct 1997)



Mr Tom Harris — Demonstrating an important point

Photo Sisi Burn



Mr Tom Harris — Demonstrating the diagram on the mechanics of voice production

Photo Sisi Burn

Hyperventilation:

An unrecognised risk factor in stage fright

Suzanna Widmer, M.A.

Introduction

Anxiety and panic disorders are often associated with chronic breathing dysfunction or acute hyperventilation (HV) (Bass, Kartsounis et al. 1987; Lum 1987; Klein 1993; Ley 1994; Gardner 1996). Anxiety can trigger or exacerbate HV and, vice versa, HV can cause or exacerbate anxiety. The relationship between anxiety and HV appears to be mediated by a variety of factors related to conditioning (Ley 1994) and cognition (Clark 1986) but the exact mechanism of these complex interactions remains unclear. Chronic breathing dysfunction (e.g. habitual overbreathing) appears to be a particularly potent co-factor, thus, putting bad breathers at an increased risk of experiencing anxiety and HV problems (Lum 1987). However, irrespective of the initial cause, once either anxiety or HV are triggered they often enhance each other in a vicious cycle until the upward spiral of hyperventilatory anxiety culminates in a panic attack.

Are these findings from panic disorders applicable to stage fright and does HV play a similarly important role in music performance anxiety (MPA)? Recent evidence suggests (Widmer et al. 1997) that MPA may be related to acute HV. In a study with 141 classically trained musicians about 70% of those reporting severe stage fright (total $n=36$) were affected by acute symptomatic HV when performing in public. Breathing dysfunction and HV seems therefore to be as important as the more commonly known cognitive, behavioural, and occupation-specific co-factors of MPA (Lehrer, Goldman et al. 1990; Wilson 1997). However, due to the widespread unawareness of HV-related MPA performance-anxious musicians are not usually being screened for breathing dysfunction. Subsequently, these musicians are not being introduced to breathing-oriented approaches to the management and prevention of hyperventilatory MPA.

The physiology of acute and chronic HV

Acute HV and chronic breathing dysfunction can be caused by a wide variety of factors such as an emotional trauma (for example bereavement or a mugging), organic disorders, surgery, drugs, high altitude, fever, pain, air travel or the fight/flight reflex. The latter is triggered by an acutely stressful stimulus which activates the sympathetic division

of the autonomic nervous system. Within seconds the body is flooded with stress hormones causing faster heartbeat, sweating, dry mouth and increased muscle tension. The respiratory drive is increased and airways dilated to facilitate greater movement of air in and out of the lungs. The evolutionary survival value of this mechanism is obvious: it prepares the body for an active response, either to fight or flee. However, if an individual keeps breathing fast and deep but does not engage in the expected physical activity things can start to go wrong. Respiration quickly exceeds the body's metabolic needs and acute HV strikes, causing a wide range of symptoms ranging from tingling in the fingers or lips and disturbances of motor co-ordination to dizziness (table 1). To illustrate the potency of HV it should be noted that all of the hyperventilatory signs listed in table 1 can also be produced in absence of the initial fight/flight reflex. Just a short episode of voluntary hyperventilation may be all that is necessary to produce most of these symptoms (with the exception of the more severe and rarer symptoms such as e.g. tetany, paralysis which require longer and more sustained HV). Two major physiological mechanisms account for these hyperventilatory signs. The first is associated with a HV-induced increase in neuronal excitability causing tingling sensations and muscle spasm. The second mechanism is linked with an inappropriate reduction of the carbon dioxide levels in the blood and a subsequent blood pH shift towards alkalosis. This results in a narrowing of arteries and subsequent reduced oxygen availability at the tissue level. Acute HV can reduce the blood flow to the brain by up to 50% (Lum 1994), depriving it of its primary fuels, oxygen and glucose. This produces quite dramatic disturbances of consciousness (e.g. light-headedness, dizziness, fear of or actual loss of consciousness) similar to those experienced in anxiety and panic attacks. It should be noted, however, that anxiety without HV causes no narrowing of arteries (Mountz 1989), thus, anxiety or panic without acute HV cannot account for these centrally mediated disturbances.

It appears that individuals with a healthy breathing pattern are less susceptible to acute HV and panic attacks. In a normal breather severe (voluntary) overbreathing is required to cause a deep enough drop in the blood's carbon dioxide levels to produce symptoms such as tingling and

dizziness. Due to a self-regulatory mechanism breathing soon returns to normal and HV symptoms quickly disappear. However, if overbreathing is continued for some time beyond the initial acute episode the body's carbon dioxide levels are gradually down-regulated. Eventually, a bad breather's self-regulatory mechanism considers chronic, subtle overbreathing as 'normal'. Unlike a healthy breather who needs a dramatic episode of overbreathing to induce the first signs of HV, these chronic hyperventilators need only a few deep breaths to cause HV symptoms or even a hyperventilatory panic attack since carbon dioxide levels are just hovering over the symptomatic hazard zone. It is thought that the lack of this natural stress- or 'HV-buffer' in these habitual overbreathers is partially responsible for their increased anxiety and panic proneness.

Stage fright and the HV trap

Acute and chronic hyperventilation appear to be largely unrecognised risk factors in debilitating MPA. Interestingly, about 70% of musicians with severe stage fright hyperventilate strongly in performance and almost half are chronic hyperventilators (Widmer et al. 1997). Imagine an orchestra musician being geared up by the fight/flight-HV mechanism for strong physical action but being forced to do the exact opposite, namely to move as little as possible. This is a perfect set-up for acute HV since most hyperventilatory attacks occur during episodes of maximum stimulation and minimum physical exertion (Lum 1994). The anxious and hyperventilating musician may soon feel an overwhelming urge to either run off the stage (which, luckily, happens only very rarely) or is 'paralysed by fear', one of the classic manifestations of HV. Altogether it appears that many of the symptoms reported by anxious performers such as difficulties with breathing and concentration, trembling, dizziness or muscle tension could be either directly caused or at least exacerbated by acute HV in susceptible individuals. Furthermore, chronic breathing dysfunction seems to act as a springboard for acute hyperventilatory MPA. Remember that a permanently down-regulated carbon dioxide level does not tolerate too much heavy breathing. Anxious musicians are therefore often unaware of the dangers of 'deep

breathing exercises' which may in fact produce symptomatic HV and, thus, exacerbate anxiety and tension in habitual overbreathers.

A self-screening programme for breathing dysfunction

Performance anxious musicians are not usually being screened for habitual overbreathing or acute HV. However, a differential diagnosis would help to detect breathing dysfunction and subsequent breathing retraining could soon bring hyperventilatory MPA under control. Although a full respiratory assessment should best be carried out by an experienced breathing therapist a simple self screening test may help to identify first signs of an underlying HV proneness. The following exercise is best carried out whilst sitting in a comfortable chair in quiet and undisturbed surroundings.

Relax for a few minutes and then go through the following awareness exercises:

1. How fast is my breathing?

Place one hand on the abdomen and the other on the upper chest and count your breathing cycles for one minute (in and out breath count as one).

In a relaxed resting state 8-12 breaths per minute are considered to be normal. 16 breathing cycles or more are suggestive of habitual overbreathing.

2. Am I an abdominal or upper chest breather?

Same position as above. Watch the movements of your hands as you breathe in and out and observe which hand is moving first and/or foremost.

In a relaxed resting state the breathing wave should start from the abdomen upwards towards the chest. Breathing movements should be primarily abdominal and the chest moves very little. In dysfunctional breathers the upper chest usually moves first and foremost (indicating upper chest breathing) and there is usually very little abdominal movement.

3. How regular is my breathing?

Become aware of the rhythm of your breathing. Are you aware of any frequent nervous coughing, sighs, unnecessary throat clearing in everyday life?

In a relaxed resting state breathing should be quite imperceptible and regular and each exhalation should be followed by a brief pause. Irregular breathing and frequent sighs are common signs of a disturbed breathing pattern potentially indicating chronic overbreathing.

4. For how long can I hold my breath?

Breathe out and measure how long you can hold your breath without starting to feel too uncomfortable.

A bad breather would start feeling extremely uncomfortable after a short period (usually after less than 10 seconds) of holding his/her breath.

5. Do you often experience 'disproportionate breathlessness' in everyday life?

How often do you get a feeling of being unable to get a satisfactory breath in your daily life? Do you quickly run out of breath when exercising?

'Air hunger', the inability to get a satisfactory breath and 'disproportionate breathlessness' (particularly after mild physical exertion) is commonly reported by habitual overbreathers and is a sign of a disturbed respiratory regulation.

A disordered breather would find his or her breathing to be fast (1), predominantly in the upper chest (2), irregular and accompanied by sighing etc. (3) and the breath holding time would be less than 20 seconds (4). In addition, bad breathers frequently experience air hunger and disproportionate breathlessness in daily life (5). If similar evidence of disordered breathing is found in at least four out of five categories it would probably be quite useful to consider a thorough check-up. Such a screening may also include the assessment of any hidden organic, physiologic, metabolic or postural co-factors and/or causes of breathing dysfunction. Based on the findings a holistic and often interdisciplinary self-help program will be devised which teaches slow abdominal respiration and pre-performance hypo-arousal breathing methods, postural training, care of accessory respiratory muscles, nutritional advice, cognitive training and stress management.

Emergency measures for an acute hyperventilatory panic attack.

An acute hyperventilatory panic attack can be very frightening. Sufferers may experience any of the classic HV symptoms (list 1) and describe feeling suffocated, losing touch with the environment, fear that they are going to have a heart attack or 'going mad'. The following measures may be helpful in dealing with an acute situation but should not be used instead of seeking professional help.

1. One of the classic emergency measures for hyperventilatory panic is to place a paper bag over the nose and mouth and re-breathe the exhaled air. Symptoms should disappear quickly. Note that this procedure should not be attempted in people with respiratory disorders such as asthma where it can have fatal consequences.

2. Physical exercise such as walking up the stairs, running on the spot or going for a brisk walk around the block all abort HV symptoms quickly and efficiently. After this physical exercise upper chest respiration can be switched to abdominal breathing. Breathing rate can be gently slowed down and a pause introduced after each exhalation.

3. Catastrophising should be replaced by rational thoughts. Symptoms become less threatening once the underlying physiological mechanism of HV is understood. It should be remembered that no healthy person has ever 'gone mad' or died of a heart attack as a result of HV or hyperventilatory panic. Rational and positive thinking can cut through the feedback cycle of anxiety, catastrophising and HV symptoms and puts the individual back in control.

Prevention

An acute panic attack of hyperventilatory MPA may be prevented by avoiding certain HV-related risk factors and triggers. Since chronic overbreathing has been associated with hyperventilatory panic a healthy breathing pattern is a first step towards successfully 'buffering' an acute HV attack. Similarly, musicians with a known HV/MPA-proneness should try to avoid respiratory stimulants such as caffeine, nicotine or very high doses of aspirin which can precipitate HV. Appropriate medical advice should be sought by alcohol dependent individuals during the period of alcohol withdrawal since the latter can be responsible for acute HV. Since HV-induced disturbances of consciousness are exacerbated by hypoglycaemia a high blood sugar level should be maintained throughout the day, particularly before and during performances. Female performers should be aware of the aforementioned precipitators of HV in particular during the pre-menstrual phase which has been associated with an increased HV risk. Wearing tight jeans or concert clothes/shoes, poor posture and permanently shortened accessory breathing muscles may all perpetuate chronic breathing dysfunction, potentially paving the way for hyperventilatory MPA.

Conclusion

Dysfunctional breathing can play a pivotal role in debilitating MPA. A differential screening of highly anxious musicians is therefore suggested to identify this HV-related subtype of MPA. The latter can be controlled by a treatment package which has a breathing retraining/awareness programme at its core. Such an approach offers not only an effective, low-cost and non-stigmatising way of coping but is particularly well suited for the prevention of a potentially disabling condition.

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Table 1:**Symptoms associated with acute hyperventilation**

Cardiovascular symptoms such as:
faster heart beat, atypical chest pain

Disturbances of consciousness such as:
dizziness, giddiness, lack of concentration, losing touch with the environment, hallucinations, lack of concentration, loss (or near loss) of consciousness

Symptoms affecting the musculo-skeletal system and motor functions such as:

numbness or tingling sensations (usually in the fingers or around the lips), stiffness (of fingers, arms, around the mouth) or paralysis, muscle spasm or tetany, disturbances of motor co-ordination, cold extremities, tremor

Nausea, vomiting

Blurred vision

Ringing in the ears

Feelings of suffocation, shortness of breath

Headaches

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Book Reviews

Anatomy and Antinomy

THE MUSICIAN'S HAND:
A CLINICAL GUIDE

Ian Winspur and
Christopher B. Wynn Parry

London: Martin Dunitz,
1998, xiii + 200. £49.95

THE ATHLETIC MUSICIAN:
A GUIDE TO PLAYING WITHOUT PAIN

Barbara Paull and Christine Harrison
Lanham: The Scarecrow Press,
1997, xv + 175. £25.65

Until recently, near-universal concentration on the 'transcendent' qualities of music has made the discussion of performance from a strictly physical point of view seem almost vulgar. These two books are testimony to the demise of such prejudice, and remind us, sadly, of the great numbers of musicians who sustained serious injuries at a time when proper treatment was the preserve of sport. They also exemplify the differing ways in which medical approaches are being assimilated by the musical community. *The Athletic Musician* is written specifically for musicians who have little medical knowledge, while *The Musician's Hand* gathers together results from the most advanced research for the particular benefit of doctors and surgeons.

The authors of *The Musician's Hand* also sense a duty to cater for the ordinary musician as well as admirable in itself, but productive of some overall inconsistency as the book swings from esoteric clinical discussion to consideration of the practicalities of music-making. *The Athletic Musician*, with its encyclopaedic programme of advice for musicians, faces no such problems. In the words of the foreword, it is simply 'a maintenance manual for... the human body, showing how to keep it running smoothly'. One chapter is entitled: 'Anatomy for musicians, or, everything you wanted to know about necks, backs, shoulders, arms, and hands but were afraid to ask.' The book is equipped with excellent diagrams, especially notable for presenting anatomical drawings of the human body in the act of performance. Physiology is never abstracted from the musical situations in which it is used, with constant reminders that *correct technique involves an interaction of the whole body and the instrument*.

As a more medically-minded book, *The Musician's Hand* is tremendously comprehensive in its coverage of diagnosable conditions, dedicating whole chapters to the consideration of some of the most devastating and complex disorders, such as *focal dystonia*. Yet it tends to separate the discussions of anatomy and of performance rather too distinctly. While it is splendidly illustrated, its anatomical diagrams and captions are intended more for surgeons than for musicians, and thus are not always helpful

on the practicalities of music-making. A glossary would have helped overcome such difficulties. The most enlightening illustrations come with the chapter discussing the 'interface', or *player-instrument interaction*. Particularly useful are the parts dedicated to piano (Carola Grindea) and guitar (Christopher B. Wynn Parry with John Williams). The former contains vital information on posture and breathing, amply demonstrating that problems manifested in the hand are likely to have their origins elsewhere in the body, and highlighting the absences elsewhere in the book of strong holistic perspectives. Certainly, the title is somewhat misleading, most chapters dealing with the arm, shoulder, neck, as well as the hand - demonstrated by the discussion of specific conditions such as tennis elbow. Nevertheless, the exclusive consideration of neck and shoulders, for example, comprises only five pages. 'Spider bite injury' appears in the index; *spine* does not.

The Athletic Musician, with its concept of the body as a complete unit, might be regarded as a kind of lifestyle manual for musicians. One of the best chapters, 'Exercise protocol for musicians', provides not only an excellent discussion of how a performer's body should be used and maintained, but also interesting advice on hobbies and sports. *The Athletic Musician* is largely taken up with injury prevention, and attempts to train musicians towards this end. *The Musician's Hand*, by contrast, focuses on operative cure. Both emphases are necessary if musicians are to benefit from medical research, but in the immediate term it is essential that musicians themselves are taught how to avoid sustaining career-threatening injury, rather than just anticipating improved therapy after the damage has been done.

As a lifestyle guide, *The Athletic Musician* frequently stresses that what feels right for the individual usually is right: for instance, in matters of sleeping posture or exertion in physical exercise. This contrasts with *The Musician's Hand*, whose prescriptively surgical focus carries much stronger notions of medical and scientific correctness. Yet, as the personal story of one musician - comprising a whole chapter of *The Athletic Musician* - shows, musicians have suffered greatly at the hands of an obstinate and authoritarian medical profession. *The Musician's Hand* has the excellent purpose of protecting the musician from clinical folly, and continually reminds surgeons of the special care that musicians must receive. Peter C. Amadio does this particularly forcefully in his chapter entitled 'Surgical evaluation: avoidance of pitfalls'. Such medical books do, however, have to guard against the entrenching of what Barbara Paull calls 'old husbands' tales': that is, firm advice based on complex, but still uncertain, medical knowledge, propped up by an intimidating mass of Latin nomenclature.

Having properly grounded music-making in physical processes, the authors of both books

judge it necessary to develop their frames of reference to include the less tangible aspects of musicianship. These are encompassed by the category of 'music psychology', involving stage fright, concentration, and mental practising techniques. Being a highly complex and controversial area of research, this requires much more attention than is afforded in these studies. The analyses appear tokenistic, and rather separate from the main bodies of discussion. What is more; they promote an unhelpfully dualistic view of the ways in which mind and body operate. There is also a tendency towards simplistic Freudian archaisms. Is it any longer helpful to be told, as in *The Musician's Hand*, that 'performers are egomaniacs with inferiority complexes'?

Odd deficiencies apart, both books are of much help and interest to the performer. Their differences should not pose any serious problems of selection for the reader. Rather they should be taken as evidence of the widening diversity and vitality of thinking within this important area of musical concern.

Nicholas Matthew, BA.Oxon

THE TRUMPET: IT'S PRACTICE AND PERFORMANCE.

A Guide for Students

Howard Snell

Rakeway Music

Distributed by:

Kirkless Music £9.95

Concerned about an 'almost total lack of knowledge displayed by young candidates about life as a musician', Howard Snell, former principal trumpet player of the London Symphony Orchestra, decided to share his professional insight. *The Trumpet* offers practical information not only about technical aspects of brass playing but on mind/, performance, and practice skills, on careers, repertoire and auditions and even deals with the politics of orchestral life, difficult conductors and anxiety control. Furthermore, it addresses questions such as 'Have I got the talent?' or 'Great Players? How do they do it?'. Most of its content is of interest not only to the trumpet player but to any instrumentalist. Perhaps the book would have benefited by offering a *key word* index. Similarly, cross-referencing could have been further facilitated by indicating page numbers instead of keywords only. However, *The Trumpet* includes a wealth of information and makes highly useful and often entertaining reading for the young musician who decides to enter the Music College. (*Does the conductor mean what he beats?*). It is hoped that such a comprehensive approach to studies will contribute to the prevention of physical and psychological health problems in professional musicians.

Suzanna Widmer M.A.

HEALTHY PRACTICE FOR MUSICIANS

Elizabeth Andrews

Rhinegold Publishing Ltd £16.95

Healthy Practice for Musicians has been written by an author who is both an accomplished viola player and a chiropractor. It aspires to cover all the main areas where physical and mental health interact with practice as a working musician. These include expected chapters on the working of the upper limbs and muscles; less expected chapters on reflexology; and totally unlooked-for but crucial advice on dietary matters and allergies. Though a veritable *vade-mecum* for musicians generally, the book centres itself on string players, not only because that is Elizabeth Andrews' area of expertise, but because string-players suffer from the greatest proportion of physical problems.

Its fifteen clearly organised chapters provide a quick way of finding any particular piece of information. They start with an introduction on how to use the book, including sobering statistics on injury rates for professional musicians (high enough to make Mr. Gould say 'I told you so!'); continue with a chapter on how people grow; and pass on some good advice on choosing a teacher and on correcting posture. Then comes much sound practical advice on memory and practising. Chapter four, entitled 'above the shoulders', deals with the physiology of the head (in particular eyes, ears and throat) in regard to musical endeavours. The section on the eyes is particularly 'eye-catching', including as it

does some Bates' eye exercises, which I am much enjoying practising, while the section on the ears includes advice to people sitting in front of loud brass players ('wear ear-plugs').

The chapter on food and diet is a masterly decanting of medical attitudes to nutrition, with the sections on cholesterol and allergies being particularly sensitive and lucid. Though they bear only a tenuous link with my own concerns as a musician, they are fully in place in this book as things which we ought to know, though few of us do. However, the section on fasting is not for the faint-hearted! The two chapters on coping with emotions make indispensable reading for musicians—most of whom have to develop individual ways of dealing with stage fright and rehearsal tension—with their clear advice on communication and relaxation, including meditational techniques and some very light self-hypnosis. Though at times becoming a little Eric T. Berne-esque, there is clearly a logical coherence in these instructions which holds the chapter together. The next six chapters, that is to say, the bulk of the book, deal with physiology. They are both comprehensive and a little heavily-loaded; certainly some diagrams of the human skeleton would help with chapter nine. In this section the author introduces the concept of muscle testing, through the application of pressure to certain specific points. At this point, I would strongly reinforce Elizabeth Andrews' instructions to read very carefully the sections on physiology and reflexology so as to be sure exactly what she means before trying any of it out. Hasty and half-understood application of these methods may do more

harm than good. In fact, the information on the physical "nitty-gritty" is remarkable. It goes into great depth on the different muscles of the fingers, for example, with which all musicians who use their hands should have at least a passing acquaintance, and the attention given to reflexology can only increase musicians' understanding of, and hopefully, sympathy for their own bodies.

This book is one to be dipped into when the need arises. If you are fortunate enough to be giving concerts abroad you would be well advised to read the chapter on travelling and what to take with you. Though some of the information is unexpected, for example, the advice on inoculations and how not to be mugged, it is always topical and accurate. Every now and then there is a loosely applied scientific term (the unit of pressure is not the kilogram but the *pascal*, for example), but these never hinder understanding.

Most importantly for our purposes, it provides an excellent background for a specific text on piano playing, for example, the excellent book by Karl Leimer. With both of these, and may be a manual of finger exercises as well, the pianist's library would be complete. All in all, an excellently written book with clear succinct sentences and a constant preoccupation with applied scientific method. My greatest disagreement comes not with the contents but with the title, as the book is patently going to be of use to many people *other* than musicians.

Edouard Tavinor

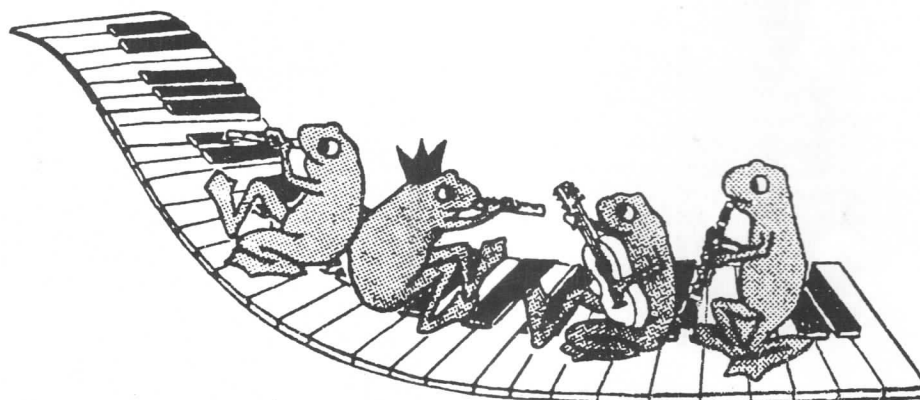
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BAROQUE VIOLIN/VIOLA

Basic principles related to Practice and Performance

"The daily discipline, the continued keeping of the elasticity of the muscles, the continued control of the mind over the body's actions, the constant hoped-for flow of the spirit into physical movement, both new and renewed, is not a natural way . . . but the final synthesis can be a natural result, natural in the sense that mind body and spirit function as one"
Merce Cunningham 1951

Useful Advice to Students, Teachers and Performers

- (a) Take an early morning cool shower. This is an ancient therapeutic custom known to many cultures.
- (b) Then start your daily routine by warming up gradually through a set of well planned exercises or swimming.
- (c) A healthy, balanced diet is of immense value to maintain a fit, alert body.
- (d) Study Yoga, Tai Chi, or other disciplines.

When practising or performing:

1. Stand up, placing the weight of the body symmetrically on both feet in parallel lines, app 30 cms apart.
2. Keep the vertebral column straight—(visualising a line crossing from the point where the sagittal suture and the occipital bones join (skull) down to the coccyx).
Imagine that you are held by the skull point as if you were a Chinese puppet, so that every single movement or articulation is related naturally to your spine.
3. Your knees should be relaxed, slightly flexed, and your body weight should be directed towards the balls of your feet, not resting on your heels.
4. The flow of energy (*chi*) generated by deep breathing should not be obstructed as this will weaken the immune system and increase vulnerability to diseases related to poor posture and tension. This is reflected musically by a constant interruption of the phrase-flow stream.

Body balance is a physical state under natural cosmic laws (gravity, magnetism). Either you act with the laws or against them. In the same way, there is a related psychological and emotional balanced state.

The division of the body into two halves - the lower concerning earth/receptiveness and the upper related to air/creativity - has been studied for centuries and has been used by such teachers as Emma Kirkby in her "grounding technique" and Jeanne Henny ("rooting technique"), both of which are concerned with the development of the body in movement, and projection, particularly of the human voice.

The relationship between instrument and player, as studied in *music ergonomics*, is a concept of unity in which the bow is the necessary extension of the arm and body, essential to achieve a purity of sound, quality of tone colours and, in rhetoric terms, clarity of speech, eloquence, invention, disposition, gesture and memory (F. Quintilian - shortly to be subject of a book by Judy Tarling) and finally communication as the art of recreating human emotions. ("Subterranean emotions", Gillian Lynne).

Comfortable Hold of the Baroque Violin/Viola

I have been experimenting with *the use of a soft scarf (preferably silk)* threaded between the tailpiece of the instrument and the body then looped around the player's neck. This should be tied firmly, but not too tightly, behind the neck to allow the instrument to lie comfortably on the left clavicle without placing any weight of the head on to the instrument. *The player does not draw the shoulder up or forward and does not press the jaw against the instrument.*

A reference to such a system is to be found in *The History of Violin Playing* by Daniel D. Boyden. In chapter 2 'The advent of true violin and its development to 1600', he states: "The Italians call it *violon de braccia* because it is supported by the arm, sometimes with a scarf, strings or other things . . ."

This suggests that the instrumentalists experimented with different accessories or positions, particularly with newly designed instruments. If one studies the images of Veracini, Leopold Mozart, Geminiani, and others, each master held the instrument using his own positioning—thus every player presents a unique structure therefore what is suitable for some might not necessarily work for others. One must also remember that "the

baroque violin/viola position has not yet been stabilised" (J. Tarling) and our knowledge is based on early manuscripts, paintings, engravings, woodcuts or early treatises.

My proposed device helps players - especially those with unusually long neck - to practise without distorting the shoulders or spine, allowing them to maintain a stance which gives them complete freedom of movements.

Just as in the past musicians studied the dances of the period, it is advisable that baroque instrumentalists should engage in this activity, which is so closely related to the music they play.

This study helps the players to experience the rhythm, while moving the body in time with the music, breathe freely, rediscover the natural balance - important aspects of performance which allow them to project fully the quality of their interpretation, its brilliancy and expression, and communicate a "natural harmonical love" (Jannina Herman) and "good taste" (Peter Holmand).

To achieve good taste in baroque music depends on the direct ratio of the attitude and manners of the player while the educational process is related to interactive social awareness.

Music is in essence a language of communication therefore the interpreter must not conform to a system based on 'musical grammar' but use the rules of articulation, intention, emphasis and contrast to bring out the emotional inner structures of expression through the development and above all, the respect of SILENCE.

Balance, harmony, sounds and rhythm working in communion with the composer within the performer are directed to the audience, and recreate and link the gap between the rational and the imaginative forces of human passion.

Vladimir Bendixen

Vladimir Bendixen is a Gregorian Chant Singer and a student of Baroque Music and Instruments.



RESEARCH PROPOSAL

MUSIC PERFORMANCE ANXIETY - USING REPERTORY GRID TECHNIQUE TO INVESTIGATE THE CONSTRUCTS OF THE ANXIOUS PERFORMER

INTRODUCTION

The disabling effects of excessive Performance Anxiety have long been acknowledged by musicians and performing artists in general. Few musicians would deny that they feel nervous before a performance but excessive performance stress can lead to a number of related problems, necessitating musicians to seek a variety of coping strategies - some effective and others more dysfunctional. There are now specific agencies who are tackling this issue directly, such as Arts Psychology, ISSTIP, and the BAPAM.

It is suggested that excessive performance tension is often the result of the individual's internal perception of themselves as an inadequate performer and/or a tendency to think catastrophically about the likely outcome of their performance (Steptoe & Fidler, 1987). With this in mind the present study is interested to further research the types of thoughts that over-anxious musicians have regarding their perception of the performance setting and the way they interpret and cope with the typical concerns of musicians prior to musical performance. The model used is Kelly's 'Personal construct Psychology' and the method utilised is the 'Repertory Grid'.

PERSONAL CONSTRUCT PSYCHOLOGY

Personal Constructs are the means by which we all interpret and learn to anticipate events. Constructs are not right or wrong, they simply serve to produce a model of the world, and individuals expect their constructs to be upheld by events in reality. Constructs may relate to our view of people, things, events and our concept of the self. Constructs may be altered and changed by continued exposure to life events and Kelly suggests that this can create a variety of affective responses in the individual, including hostility, aggression, guilt, fear and anxiety (Bannister & Fransella, 1986). The Repertory Grid is a technique designed to demonstrate the correlational interlinking of the individual's personal constructs by mapping them onto a grid which can then be analysed and patterns and trends revealed - demonstrating the individual's way of construing the world. The grid is composed of a series of Elements which may be viewed as the themes of the question being asked and a number of constructs associated with these themes as generated by the participant.

AIMS

This study is aimed at further investigating the internal personal constructs of performing musicians as related to both the

performance setting itself - the environmental and situational cues - and the way they construe typical causes of concern for all musicians preceding performance. It is expected that there will be differences in personal construct trends between those individuals who acknowledge their difficulties with MPA and those who self report that they do not - more specifically it is suggested that anxious performers are likely to have more constructs associated with catastrophic visions of the performance scenario and of their ability to cope effectively with the ensuing stress.

DESIGN

Twenty participants will be used, divided into two groups of ten, with Group A comprised exclusively of musicians who acknowledge that they have difficulties with MPA, and Group B comprised of musicians who self report that they do not. The study will use the Repertory Grid format as originally devised by Kelly (1955). In this study two grids will be composed, with the elements provided by the researcher and the constructs elicited by each participant for each grid. The grids are designed to explore the following aspects of MPA. Grid 1: Typical concerns of musicians, preceding performance. Grid 2: The performance setting as a potential source of stress. The elements for each grid are provided by the researcher but are taken from relevant research associated with the field. In Grid 1 the elements are inspired by a questionnaire by Evans (1994) designed to enable musicians to pinpoint which concerns they are most occupied with before performing. Grid 2 utilises Wills and Cooper's (1988) study on occupational stressors for professional musicians, where ten different situational cues were identified by their sample as being most influential in catalysing MPA. The results will be analysed using the GAB computer programme (Bannister and Higginbotham, 1981) - a cluster analysis which illustrates how participants apply constructs to differentiate among elements.

I feel that this research project will prove beneficial to both musicians and those practitioners who assist performers in coping with their anxieties. The field of Counselling Psychology has a lot to offer in terms of an increased understanding of the dynamics of Musical Performance Anxiety and contributions to therapeutic treatments.

Jon Wells

Research for an M.A. Degree conducted at the Psychology Dept of City University.

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- EVANS, A. (1994) *The Secrets of Musical Confidence - How to Maximise Your Performance Potential* (Thorsons)
- KELLY, G. (1995) *The Psychology of Personal Constructs, Vols 1 & 2* (Norton)

RESEARCH PROJECTS

ANNA RUN ATTLADOTTIR has completed her Dissertation for M.A. Degree in Accompaniment, on "Performance Anxiety" experienced by junior music students at London College of Music.

TATJANA OGNIENOVIC, has just completed her Dissertation on 'Musicians Problems and Injuries' as part of her B.A. Mus. Degree at Reading University.

ANTONIA IVALDI, a Postgraduate Student at the University of Keele, Psychology Department, (Prof John Sloboda), is preparing a Thesis on a topic which will combine Music and Psychology.

NIKKI BRISTOL, an Undergraduate Student at Reading University, a former violin student at Royal College of Music, is writing a dissertation as part of her finals in the Psychology Department, in which she will combine her interest in the two subjects.

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Barbara Paull is a British-trained Registered Physiotherapist who has concentrated on orthopaedic physiotherapy in many different clinical settings over 30 years and currently works as consultant, clinician, and lecturer. **Christine Harrison** is a freelance violinist working in Toronto, Canada. She has performed with various symphonic, chamber, and theatre groups, including the Canadian Opera Company and the Hamilton Philharmonic Orchestra. Together, they teach the "Playing without Pain" workshop for musicians.

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